Exhibit K

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

GOLDEN, COLORADO

GEOLOGY AND ORE RESERVES

Hammondsville Mine
Windsor Minerals, Inc.
Windsor, Vermont 05089

Johnson & Johnson

Subject: Geological Audit
Windsor Minerals
File #124

New Brunswick, N.J.

December 4, 1970

Dr. ~~T. M. Shelley~~
to
Dr. ~~R. A. Fuller~~ DEC 7 '70
to
Central Research File

Mr. R. J. Mortimer

Mr. R. N. Miller

Dr. R. L. Sundberg
to
File #124

The attached report completes our work on the nature and magnitude of our ore body in Vermont from which we manufacture Baby Powder talc.

W. Ashton

csc

EXHIBIT
Poulton-26
Date: 3-18-19
MLG, CSR, RPR, CRR

EXHIBIT 14
WIT: Downey
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MLG

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November 13, 1970

TABLE OF CONTENTS

Tables

Table of Contents - continued

Plates

Table of Contents - continued

Figures

Photomicrographs

Table of Contents - continued

INTRODUCTION

The Colorado School of Mines Research Institute was engaged by Johnson and Johnson to conduct a complete study of the mining and milling of talc by their wholly-owned subsidiary, Windsor Minerals. This study was authorized by letter from Mr. William Ashton on 12 June 1970, in which he accepted our letter proposal of 9 June 1970.

This report deals entirely with the geology and ore reserves of the Hammondsville Mine which is a source of cosmetic grade talc for Windsor Minerals Company. A report on Mine Safety was issued on 12 August 1970, and a report on beneficiation of the Hammondsville ore will be issued in the near future. A report, "Beneficiation of Vermont Talc Concentrates," was issued on 18 September 1969 (Project Number 290527).

OBJECTIVE

The objective of this study was to estimate an ore reserve tonnage and quality at the Hammondsville Mine. In conjunction with this, it was necessary to study in detail the geology of the mine and the mineralogy of the ore material. This latter information will facilitate future mine development and planning.

SCOPE

The study included an examination and detailed geologic mapping of all accessible parts of the Hammondsville Mine. All available drill core was examined and the talcose zones were split. One half was sent to Golden for mineralogic and chemical assaying. The remainder was replaced in core boxes at Windsor.

Ore reserves were estimated and, based upon the assay results, the amount of recoverable platy talc was also estimated.

Flotation tests were conducted on several samples and mineralogic and color testing was done on the cleaner concentrates.

CONCLUSIONS

The reserves at the Hammondsville Mine below the 860 Level are approximately 3.75 million tons of Indicated ore containing about 967,000 tons of platy talc. The mine life appears to be more than twenty years at the present production rate.

Ore quality varies greatly from area to area within the ore body. This is due to the variability in carbonate content and the inverse relationship between the magnesite and talc contents of the ore. On the other hand, magnesite and chlorite contents are directly related so that, in zones of high carbonate (most of which is magnesite) the color and talc content may be expected to deteriorate. In particular, it appears that the color of the finished product may deteriorate down-dip from the present mine workings. More drilling will be necessary to clarify this point.

RECOMMENDATIONS

Some additional drilling is strongly recommended. This will be necessary to ascertain whether or not the color of the recovered talc product actually does deteriorate down-dip from the present mine workings. At the same time, much of this recommended drilling will be invaluable for mine planning. Limited drilling is also necessary to improve the quality of ore reserve estimates.

A three-dimensional model showing the stopes in the southeast end of the mine, especially on and below the 860 Level should be constructed. This would be very helpful to the mine staff. Drifts and stopes could be made of some easily worked material, such as soft wood. The dimensions would not need to be precise. The main objective would be to show the relative positions of stopes. This would give a more clear picture as to what additional stoping could be accomplished. At present, Mr. Winston Dezaine, the Mine Superintendant, has a remarkably good mental picture of the deposit and appears to have done an excellent job of getting high recovery from most sections of the mine. Our impression is that stoping plans are made on the basis of visual estimates of ore quality, and an effort is made to locate pillars so that they contain poorer quality material. The success of the method depends largely on Mr. Dezaine, and if he should be unavailable for any reason, the operation would probably be severely handicapped.

Recommendations - continued

It would be well worthwhile to increase the emphasis on mine surveying and transferral of the resultant information onto level or stope maps. Monthly updating of the mine maps will allow planning for more efficient and complete extraction of the ore. The burden of this regular updating should not be placed on the Mine Manager. It should be the regular responsibility of a competent mining engineer.

DISCUSSION

Location and Accessibility

The mine is located on the east side of Vermont Highway No. 106, less than one-quarter of a mile north of Hammondsville, Vermont, and is easily accessible. The mill is approximately two miles to the southeast on the same road.

Climate and Topography

The area has the typical, extreme, New England climate. The topography is fairly rugged. Topographic relief varies as much as 1,000 feet per mile in many places near the mine. The topography appears to have been caused principally by glaciation, resulting in fairly steep slopes on the margins of U-shaped valleys.

The area was mostly cleared and utilized as pasture about the turn of the century but has been allowed to revert to dense forests, over most of the slopes, since that time.

Mine Development

The mine was originally opened in 1908 as an open pit. In recent years, underground workings have been developed from the wall of the pit. There are now two underground levels, the 860 Level and the 950 Level, which are designated by their elevations above sea level. A third level, at approximately 760 feet above sea level, is presently being developed by the sinking of an inclined shaft. The two existing levels are fairly extensive

Discussion - continued

(both are over 1,000 feet in length) and are connected by many stopes. The upper level, the 960, has numerous stopes extending upwards, some of which have holed through to the surface.

Geology

General Geology

The mine is located on the north flank of the Chester Dome, a part of the Green Mountain Anticlinorium. The talc deposit is not unique, being only one of several hundred found in a fairly linear array from Newfoundland to Alabama. These deposits are found primarily in early Paleozoic rocks which were metamorphosed to schists, gneisses, and marbles. They were formerly sands, shales, and carbonates which were deposited in near-shore or shallow-water eugeosynclinal environments. These sediments were later overthrust from east to west to form the Vermontia Geanticline which is an intensely folded north-trending belt of Precambrian and early Paleozoic rocks. The State Geologic Map of Vermont indicates that the rocks adjacent to the mine area are probably Devonian (roughly 250 million years old) whereas Chidester (1951) states that they are probably Cambrian or Ordovician in age (roughly 350 to 600 million years old). Eardley (1962, p. 170) indicates that they are Silurian (between the previous two ranges) in age.

Discussion - continued

The rocks of the region are primarily metamorphosed sedimentary rocks. However, these schists, gneisses, and marbles are intruded in many places by igneous rocks (mostly acid, or granitic). Extrusive igneous or volcanic rocks are also present.

The Mount Ascutney stock, a few miles to the southeast of the mine, is a granitic intrusive body which has intruded and truncated the Standing Pond volcanics of the Devonian (Silurian?) Waits River Formation. These volcanics are reported to extend to within a mile or so of the mine and there have been a few basalt dikes noted in core from the mine area as well as within the mine workings proper.

It is the author's opinion that one or more of these igneous bodies was the source of silica, which was added to a magnesian carbonate, probably dolomite but possibly magnesite, to form talc. The generalized reaction is shown below:

$$\underset{CaMg(CO_3)_2}{\text{Dolomite}} + \underset{SiO_2}{\text{Silica}} \rightarrow \underset{3MgO\cdot 4SiO_2}{\text{Talc}} + \underset{CO_2}{CO_2 \overset{\text{gas}}{\uparrow}} + \underset{Ca^{++}}{\text{Soluble Calcium Salts}}$$

Intermediate and side reactions could have given rise to a number of products which are not shown here. Among them are brucite, chlorite, magnesite, and various clays and calcium complexes.

Discussion - continued

Mine Geology

The host rocks for the ore body are mostly quartz-biotite schists and/or gneisses. These are at least a few hundred feet thick in the hanging wall of the mine. In many places they become garnetiferous and contain a few thin quartz veins, mineralized with pyrite and pentlandite. A few thin (six inches to three feet) basalt dikes are also present.

In most places along the walls of the talc body at Hammondsville, the host rock has been converted to a chloritic biotite schist. This may be the result of alteration along a stratigraphic contact or it may represent a facies change in the pre-existing rocks. This coarse-grained biotite or chlorite schist contact has been called blackwall by the miners.

The blackwall schist is used as a stratigraphic marker in mining to determine the location of the edge of the ore zone. It varies in thickness from a few inches to a few feet. Where the talc pinches out between ore lenses on the 860 Level, a thin layer of the blackwall can be followed from one lens to the next. This contact should be traceable for some distance from the mine, stratigraphically, and should aid in exploration.

The talc deposit at Hammondsville has a general tabular form with an average strike to the northwest and dip to the northeast at about 20 degrees. The talc bodies within the mine have a general lensoid to tabular form.

Discussion - continued

There are many local variations in strike and dip of both the hanging wall and, particularly, the footwall. As a result, the ore body varies radically in its strike direction and thickness. The lenticular and pod-like character of the deposit is therefore, probably not the result of tight, overturned folding but, more likely, is due to variations in thickness of the pre-talc carbonate body. Later, dynamic metamorphism would have streamlined the shape during movement.

The thicker parts of the ore body contain a core of chlorite and carbonate which is actually a chloritic marble. This has been called "serpentine" by the miners and "verde antique" by others (Chidester, 1951). The latter term, although somewhat a misnomer, is used in this report as it describes the physical appearance of the rock quite well. Technically, however, a verde antique should contain serpentine. There has been no serpentine detected by either petrographic or x-ray analyses in either the core or the rock samples from the mine. The material which makes up the core of the thicker parts of the ore body may be an intermediate alteration product from carbonate to talc or, it may be a product of retrograde metamorphism of dolomitic marble. In detail, it appears in irregular masses, crosscutting the schistosity (see the 860 and 950 Level maps), but in the broader sense it seems to occur at a definite horizon (see Cross-Section L).

Discussion - continued

The very irregular nature of the footwall makes it difficult to follow in development drifts. Consequently, it is poorly exposed in most places, or not visible at all, so that its exact position and attitude is not clear. A postulated pattern is shown diagrammatically on the 860 Level map.

Some layers and irregular blocks of chlorite-biotite schist occur within the talc ore body and are called "cinders" by the miners. These create a problem in development work as they may easily be mistaken for the true footwall of the deposit. To guard against development drifts being turned into the talc body, short test holes are drilled into the footwall as drifting progresses. In most, and possibly all cases, where the development drift has been turned away from the footwall because of cinders, the fact has been recognized as stoping began, and mining has been continued to the true footwall. To a much lesser extent, development drifts have been deviated from the true hanging wall because of cinders. Again, this has usually been corrected fairly quickly.

In the southeastern part of the mine, the ore body has a thick lenticular form, with a very irregular footwall. It reaches a maximum thickness of about 170 feet (including the verde antique core) but pinches rapidly along strike (see Cross-Section 4-67 to 9-66). Down-dip, the lens seems to decrease in thickness and increase in strike length so that its form be-

Discussion - continued

comes more tabular with depth (Section 3-67 to 52-68) (see also talc thickness contour map, Plate 1 and in pocket).

The lens then pinches out altogether about 2,000 feet down-dip from its outcrop at an elevation of about 500 feet. The ore body appears to pinch out abruptly and completely along its southeastern edge. Extending the drifts there may develop a little more ore.

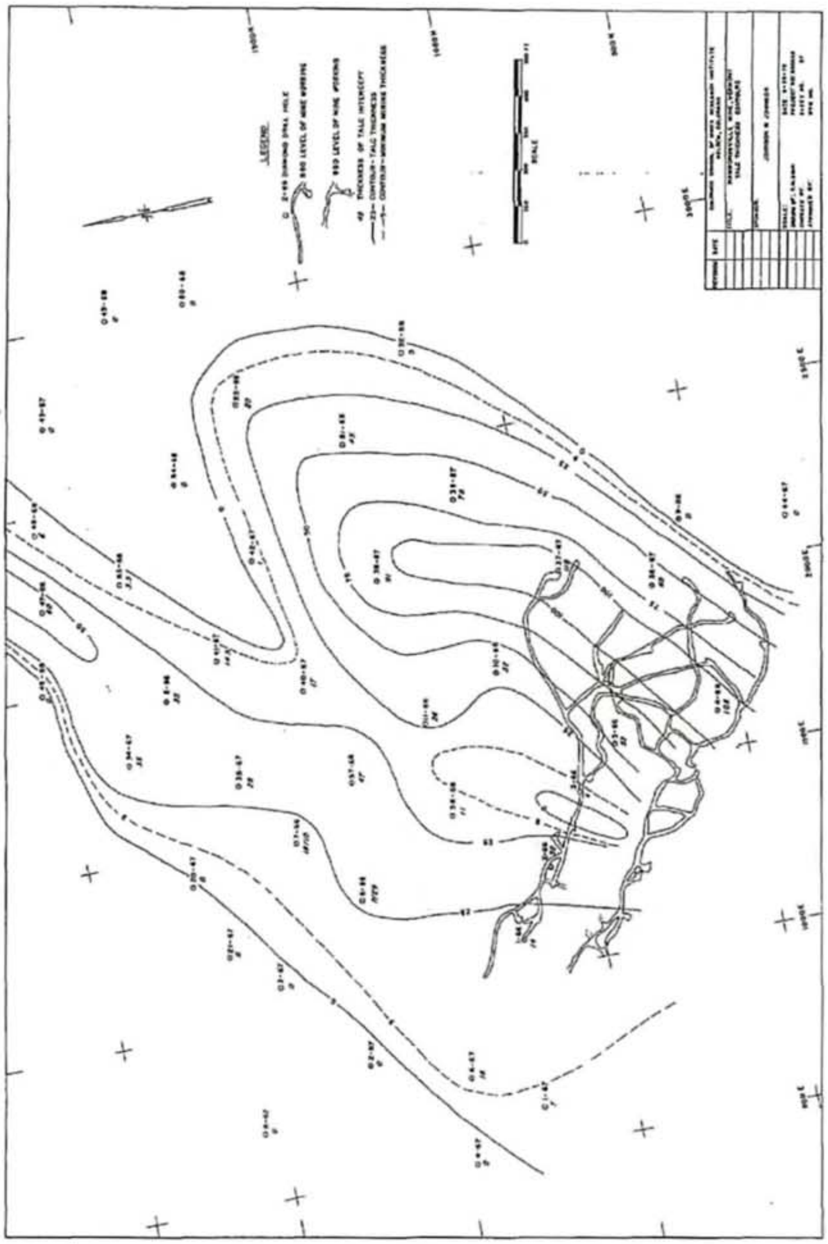
The ore body pinches out in the central part of the mine as seen on the 860 Level but this pinchout is apparently gone 400 feet down-dip, at an elevation of about 650 feet, where the ore body appears to have a continuously mineable thickness along a strike length of about 1400 feet.

Along its northwestern edge, the deposit tends to split into talc layers which thin to the northwest. These are separated by increasing thicknesses of waste. Mining in this direction will be limited by the thickness of the thickest talc layer, rather than by the combined thickness of all the talc layers. This fact has been taken into account in both the isopach map of the ore (Plate 1) and in the ore-reserve estimate.

Thin Section and X-Ray Analysis of Selected Rocks

Thirty-eight core samples were submitted for thin-section analysis. All but a few of these were from within the ore zone.

Plate 1 - Talc Thickness Contours (isopach map)



Discussion - continued

These were studied to determine the various rock types and to examine the relationships between the mineral phases. Some attention was paid to possible origins of the talc in order to make suggestions for further exploration work. The descriptions of the individual rock specimens will be found in the Appendix, Exhibit 2.

It was evident during this phase of the investigation that optical differentiation between chlorite and talc, when in fine grains, is nearly impossible. The refractive index, in oil, of the two minerals is nearly identical. The high-magnesium chlorite which occurs within the Hammondsville ore body is colorless, or nearly so, in thin section and is therefore nearly indistinguishable from the platy talc. Larger grains of chlorite do exhibit weak pleochroism and may be distinguished by this property.

Several thin sections were made of the host rock and, for the most part, it was found to be a quartz-biotite schist exhibiting some gneissosity. In places, this rock becomes garnetiferous. The garnets are almost without exception subhedral and appear to have been altered to clay. In many cases, the garnets have been embayed by chlorite, indicating probable retrograde metamorphism. The subhedral character of the garnets has been studied in Vermont by students at Harvard University and has been described in the literature. These are called "rolled"

Discussion - continued

garnets with the implication that they were rolled and crushed during dynamic metamorphism of the country rock. The crystal shape was assumed to have been destroyed during such treatment.

It appears from the petrographic work on the thin sections that the talc has resulted from metamorphism of a carbonate rock. This would agree with the field evidence as interpreted by the author. A particularly convincing piece of evidence was obtained in a thin section of material from Diamond Drill Hole No. 6-67 at a depth of 167 feet. A photomicrograph of a portion of that thin section is shown as Plate 2. It can be seen that the talc occurs as an embayment in a carbonate grain. This indicates that the talc was formed at the expense of the carbonate (magnesite). The thin skin or contact zone between the talc and the magnesite is chlorite. This identification of the minerals was corroborated by electron-microprobe analysis. The results of a traverse across the embayment (line X-X' on the photomicrograph) are shown on Plate 3.

Because of the partially inconclusive nature of the optical studies, x-ray-diffraction analyses were made of the rocks from which the thin sections were cut. This technique, in conjunction with the optical work, appears to have yielded a fairly accurate semi-quantitative estimate of the mineralogical constituents of each rock. In addition, x-ray analyses make it possible to differentiate between the three carbonate phases

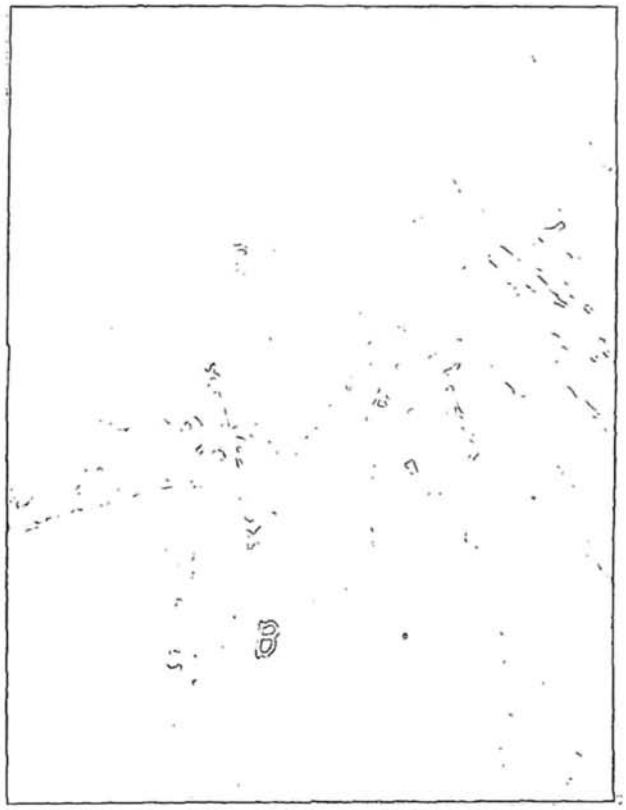


Plate 2 - Specimen 6H-167 showing a fine-grained talc-chlorite embayment in a carbonate particle.

(A) Fine-grained talc-chlorite intermixture.
(B) Magnesite, $MgCO_3$, particle.
(C) Chlorite seam.
(D) X-X' approximate electron microprobe traverse shown in Plate 3.

Scale
0.1 mm

Crossed polarizers

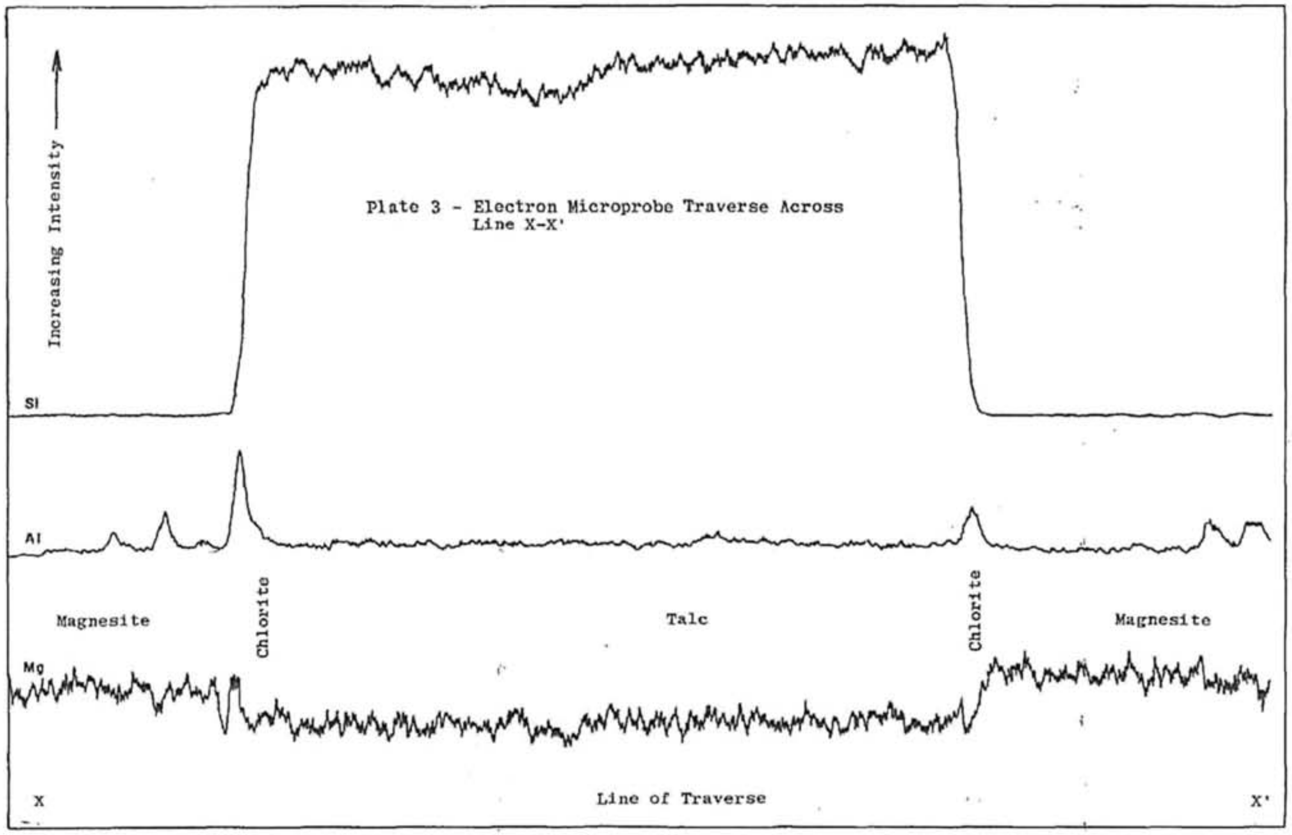


Plate 3 - Electron Microprobe Traverse Across
Line X-X'

Discussion - continued

of these rocks (magnesite, dolomite, and calcite) as well as between chlorite and talc.

The following table (Table 1) summarizes the results of the petrographic and x-ray examinations of the rocks submitted for thin-section analysis.

The consensus of opinion in the available literature about the genesis of the talc bodies in Vermont seems to be that they formed as an alteration product from ultrabasic intrusive igneous rocks (Chidester, et. al., 1951; Trauffer, 1964; Gillson, 1927). Chidester (1951) however, seems to suggest that the talc at the Hammondsville Mine might be the result of metamorphism of a carbonate body. This is the opinion of this writer.

A postulated paleo-environment which would result in the formation of the Hammondsville ore body as we see it today may have resembled in many ways that environment found presently in the Gulf of Mexico. This environment would have consisted of a relatively low-lying land surface from which sands and muds were derived, and a fairly shallow sea (a eugeosyncline--Eardley, 1962, p. 169) which would receive these sediments. Carbonate deposition was certainly taking place, possibly in the form of reefs. These may have been either discontinuous or eroded so that the topography resembled in many ways the present-day channeling seen in the carbonate reefs between Florida and the Bahamas. Filling of these channels with clastic sediments

TABLE 1

PETROGRAPHIC CLASSIFICATION AND RESULTS OF X-RAY DIFFRACTION ANALYSIS ON ROCK SAMPLES

D.D. Hole	Interval	Rock Classification	Relative X-Ray Diffraction Peak Heights (Cm) Talc	Trem/Act	Chlorite	Quartz	Calcite	Dolomite	Magnesite	Mica	Feldspar
2-67-H	301	Garnetiferous quartz-biotite augen schist				1.0		0.3		1.3	
6-67-H	139	Schistose augen marble	0.9		0.7			0.3	0.2	Tr.	
	141	Augen marble schist	2.0		0.5			0.1	0.4		
	150	Augen marble schist	2.5		0.5			3.2	0.5		
	167	Talc-chlorite augen schist	4.5		0.2			Tr.	0.6		
	169	Schistose augen marble	2.6		0.1			0.7	3.5		
	176	Talc-chlorite schist	11.8		0.4	0.5				0.6	
34-67-H	507-C	Chlorite schist	0.7		1.3	0.2					
	518	Augen marble schist	1.8					0.6			
35-67-H	153	Basalt	0.2							0.3	0.8
	164	Contact between basalt and quartz-biotite schist				0.5				0.4	0.4
	223-A	Chlorite schist		0.4	0.2						
	223-B	Garnetiferous biotite-chlorite-quartz schist				2.4	0.3			0.8	
	223-C	Chlorite-biotite-quartz schist	0.2		Tr.	1.1				0.8	
	398	Talc-chlorite schist	3.6		0.4			0.7			
	400	Chlorite schist	0.3		1.7			0.3			
36-67-H	437	Augen marble schist	1.0		0.4			0.6	1.7		
	438	Schistose augen marble	0.9		0.7			0.1	0.1		
37-67-H	367	Schistose marble	0.9		Tr.			0.1	1.7		
	388	Talc-chlorite augen schist	0.9		0.2			1.2	Tr.		

continued

Table 1 - continued

D.D. Hole	Interval	Rock Classification	Talc	Trem/Act	Chlorite	Quartz	Calcite	Dolomite	Magnesite	Mica	Feldspar
			Relative X-Ray Diffraction Peak Heights (Cm)								
37-67-H	400	Talc-chlorite augen schist	0.6		0.2			2.6	0.2		
	440	Marble schist	3.3		0.6			0.8	0.1		
	450	Augen marble schist1/	1.7		0.6				4.0		
	451	Augen marble schist1/	1.6		0.5			2.3			
	452	Augen marble schist1/	2.4		0.6			0.7	0.2		
	453	Verde antique	1.5		1.5			0.3	0.7		
	481	Chlorite schist	1.1		2.6						
	485	Chloritic marble schist	1.5		1.2						
	487	Chlorite-talc marble schist2/	2.0		0.7	0.6					
	490	Chlorite-talc marble schist3/	4.0		1.0				0.3		
	491	Contact between chloritic marble schist and chlorite schistose marble	0.9		0.3			0.1			
	504	Chlorite marble schist	1.6		0.7			0.9	0.3		
	512	Schistose marble	1.7		0.7			0.2	Tr.		
38-67-H	494	Basalt			0.4	0.3		0.2			Tr.
39-67-H	458	Chlorite-talc schist	2.3		0.9	0.7		0.2	Tr.		
	532	Chlorite-talc marble schist	2.2		0.9			0.3	0.2		
	534	Schistose augen marble	1.3		0.2			0.1	0.4		
	544	Schistose augen marble	1.0		0.4			0.1	0.9		

1/ Could possibly be classified as verde antiques.
2/ Contains distinct talc seam perpendicular to schistosity.
3/ Contains distinct talc seam parallel to schistosity.
Tr. Trace detected.

Discussion - continued

followed by metamorphism during the thrusting of great fault blocks from east to west would result in isolated pods or bodies of carbonate rocks surrounded by schists and gneisses. Dynamic and regional metamorphism would further modify this picture until these isolated bodies of carbonate rock (probably marble) would assume lenticular or tabular shapes within the schists and gneisses.

An extremely high percentage of early Paleozoic carbonates are dolomites. Nearly every talc deposit which has been examined by the author has been the result of silicification of a dolomite, usually of early Paleozoic or Precambrian age. The chemical change is fairly simple. At low temperatures and fairly low pressures, the magnesium present in the dolomite is combined with silica, probably from an igneous source. The carbonate is driven off as carbon dioxide. The abundance of chlorite within the Hammondsville ore body may be explained as a product of retrograde metamorphism of the dolomitic marble from which the talc was formed.

Evidence for the hypothesis offered above is rather abundant. Mount Ascutney is suggested as a source for the silica, and, consistent with the above theory, there is a very high remnant carbonate content within the ore body (25 to 50 percent). The complete absence of any igneous minerals (serpentine or relict ultrabasic minerals) within the Hammondsville ore body (other than the basalt dikes--which are later) is negative evidence against an

Discussion - continued

igneous origin.

If the above hypothesis is correct, exploration could be tied closely to stratigraphy. Prospecting along the zone of contact between the hanging and footwall rocks (east and southeast of the mine) would be indicated. The geologic map of the state of Vermont indicates that the ore body is found on the nose of a small anticlinal structure abutting against the Mt. Ascutney stock to the southeast. It seems quite likely to the author that more talc deposits could be found along the stratigraphic contact on this structure.

Ore Reserves

The ore reserves remaining in the mine below the 860 Level are estimated to be 3,736,000 tons. This ore contains an estimated 967,000 tons of platy talc. These figures were arrived at by assuming a 60 percent mining extraction and a minimum mining thickness of nine feet. These latter two figures were furnished by the management at Windsor Minerals.

The ore is considered Indicated on the basis of the ore classification system adopted by the U.S. Geological Survey and the U.S. Bureau of Mines (Senate, 1947) which appears below.

> "'Measured ore' is ore for which tonnage is computed from dimensions revealed in outcrops, trenches, workings, and drill holes and for which the grade is computed from

Discussion - continued

> the results of detailed sampling. The sites for inspection, sampling, and measurement are so closely spaced and the geological character is so well defined that the size, shape, and mineral content are well established. The computed tonnage and grade are judged to be accurate within limits which are stated, and no such limit is judged to differ from the computed tonnage or grade by more than 20 per cent.
>
> "'Indicated ore' is ore for which tonnage and grade are computed partly from specific measurements, samples, or production data and partly from projection for a reasonable distance on geologic evidence. The sites available for inspection, measurement, and sampling are too widely or otherwise inappropriately spaced to outline the ore completely or to establish its grade throughout.
>
> "'Inferred ore' is ore for which quantitative estimates are based largely on broad knowledge of the geologic character of the deposit and for which there are few, if any, samples or measurements. The estimates are based on an assumed continuity or repetition for which there is geologic evidence; this evidence may include comparison with deposits of similar type. Bodies that are completely concealed may be included if there is specific geologic evidence of their presence. Estimates of inferred ore should include a statement of the special limits within which the inferred ore may lie."

Ore reserves were calculated on the basis of 175 pounds per cubic foot of rock in place. This factor is commonly used for the California talc ore (Rassmussen, Charles Pfizer Co., Personal Communication, 1970). It also is within 10 percent of a theoretical value (McKinstry, 1948) and an empirical value obtained

Discussion - continued

from a large piece of Hammondsville ore. The grades assigned to the various drill holes were obtained by assaying the available core. Those drill holes for which no core was available were assigned the average value obtained for all of the core which was assayed. The estimate does not include any ore above the 860 Level and would have to be increased by the amount of recoverable ore still remaining above that level.

Ore Reserve Calculation

All ore-reserve estimates depend upon the analysis and weighting of a body of sample data. When samples are randomly spaced throughout a large deposit the question of sample weight, or volume of influence, becomes extremely significant. When properly weighted, irregularly spaced samples can provide a very precise estimate of the true tonnage and grade of the deposit.

In the case of the Hammondsville ore body, the reserve estimate is based upon data from 40 diamond-drill holes. Several methods of weighting drill-hole data were considered. Two of these, the polygonal and the triangular area-of-influence methods were used independently and the results were within about 10 percent of the final calculation utilizing a combination method.

The triangular area-of-influence method is probably the simplest and most widely used method of weighting irregularly

Discussion - continued

spaced drill samples. The area is divided into triangles with a drill hole at each corner as shown in Plate 4. The volume is computed from the area of the triangle and the average thickness of the ore in the three holes. A weighted average of the grade in the three holes is assigned to this volume. Extreme variations in thickness, or grade, or drill-hole spacing will distort the results obtained through the use of this method.

The polygonal area-of-influence method is quite similar to the triangular method. The polygons are developed by drawing bisectrices on each of the lines joining adjacent drill holes. The intersections of the bisectrices become the corners of a polygon with a drill hole at the center. The volume is determined by using the area of the polygon and the thickness of the ore intersection in the drill hole. Grade of the material in the drill hole is assigned to this volume. As in the triangular area-of-influence method, the wide spacing of the drill holes causes problems. With polygons only, an inordinate area of influence is assigned to some of the drill holes because of the wide spacing, and the method was not used for this reason. The areas of influence obtained through the use of this method of weighting are shown in Plate 5.

Other methods of calculating reserves involve the use of isopachs (contours of equal thickness) or cross-sectional areas

Plate 4 - Triangular Areas of Influence

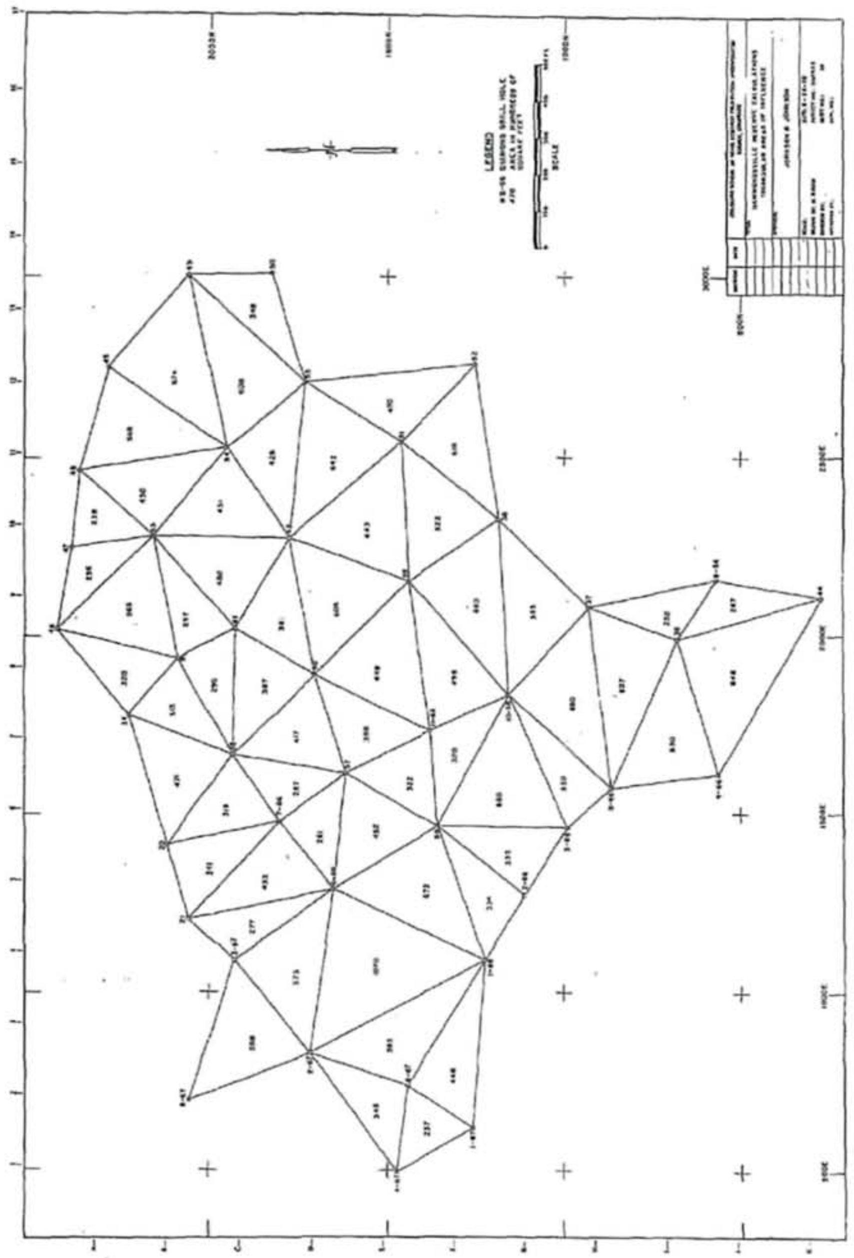
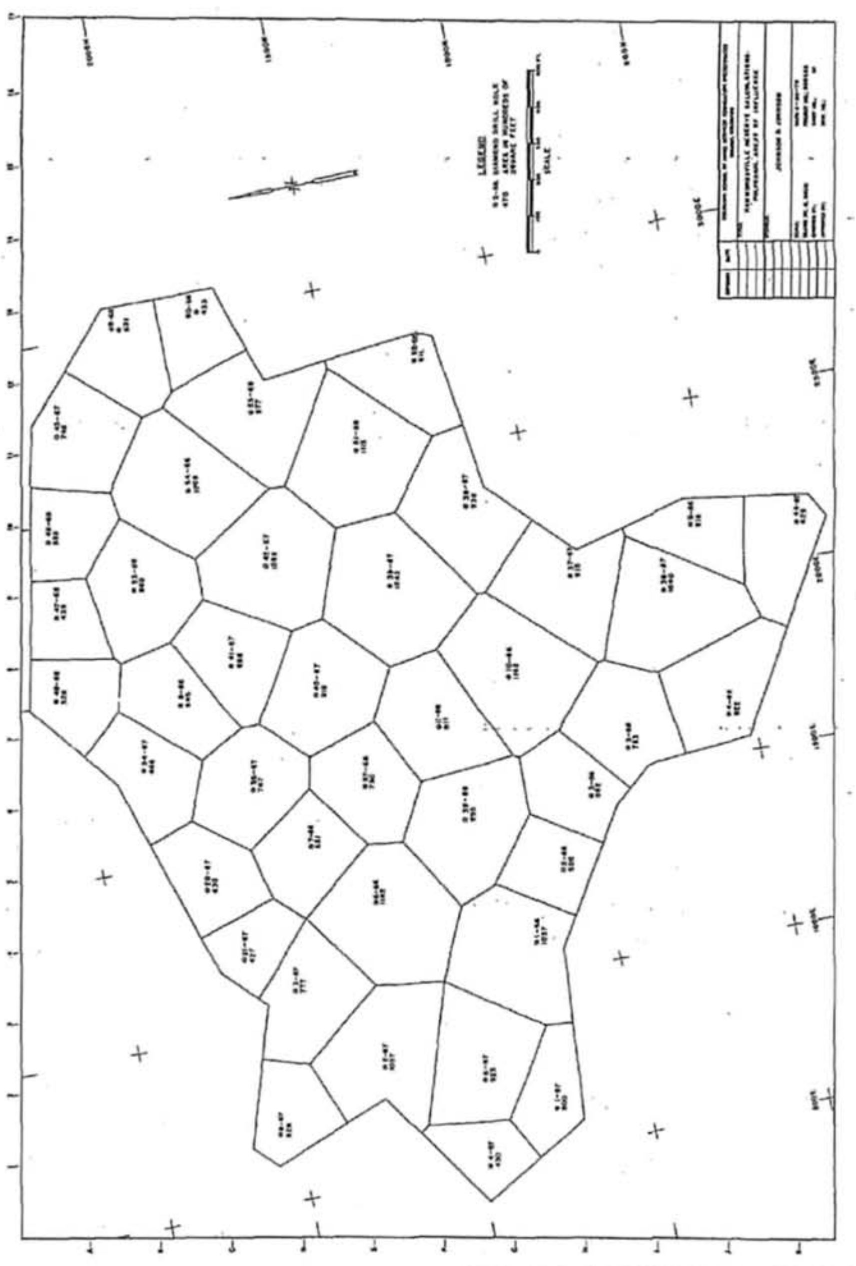


Plate 5 - Polygonal Areas of Influence



to determine the volume of a deposit. Usually, these methods assume a uniform grade throughout the entire deposit.

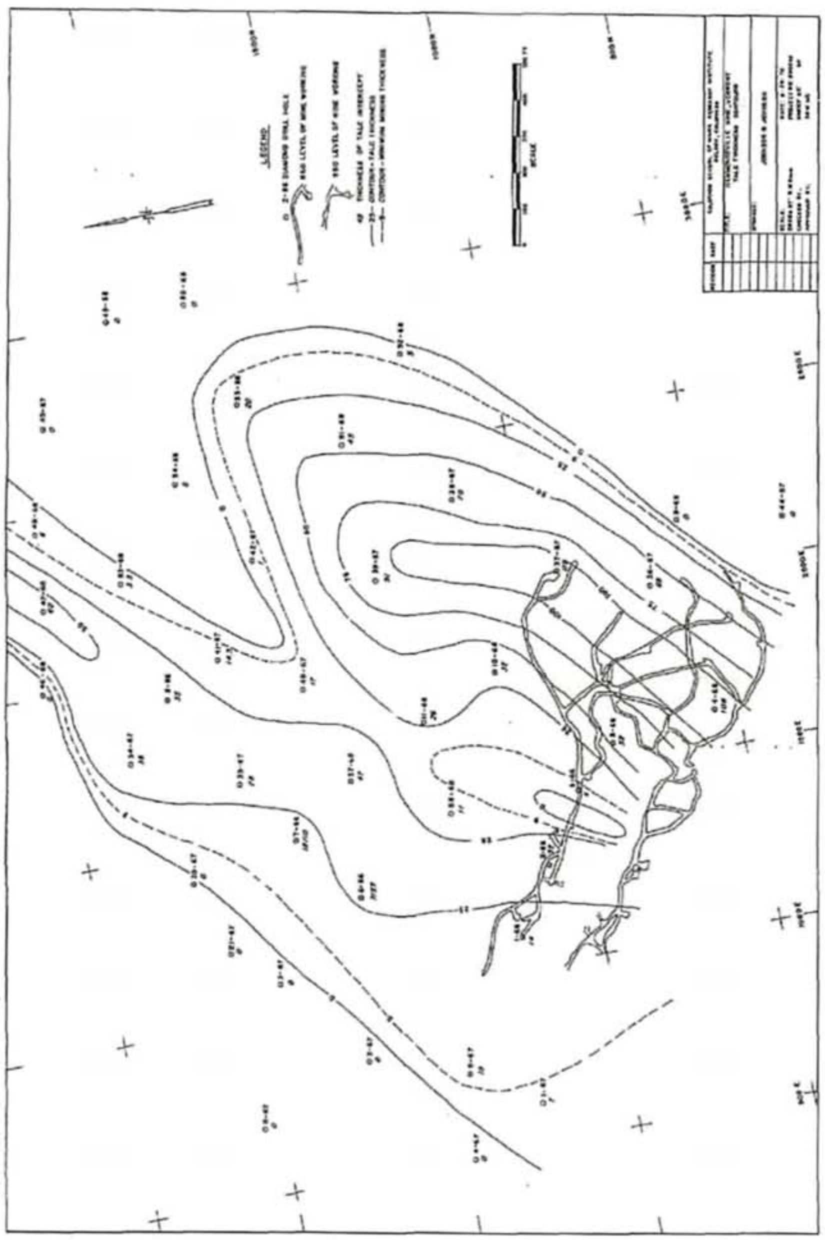
The method used in calculating ore reserves for this report combines two different techniques and is thought to be the most realistic method of calculating ore reserves for the Hammondsville Mine.

The method involves combining the isopach map of talc thicknesses (Plate 1 and in pocket) and the polygonal areas of influence of the various drill holes (Plate 5). The area for each polygon was combined with the thickness from the isopachs to obtain the volume; the ore grade within the appropriate polygons was assigned to the respective volumes. These values were then totaled to give the weighted ore reserve estimate.

The advantage of this technique is that the variation in grade is assigned to an appropriate volume based upon the polygonal area of influence of the drill holes and the more accurate volume is obtained from isopachs.

In preparing the isopach map no corrections were made for the dip of the ore body because it was generally shallow dip. Deviation of the drill holes seems almost a certainty. The majority of the core examined indicated that the vertical holes had deviated enough to intersect the schistosity of the ore and host rocks at a nearly perpendicular angle. This is frequently

Plate 1 - Talc Thickness Contours (isopach map)



a problem when drilling in schistose or gneissic rocks.

An examination of the isopach map, Plate 1 seems to indicate that the minimum-mining-thickness contour (nine feet) on the southeast side of the map is displaced almost 100 feet to the east. This contour was drawn on the basis of drilling information and was modified slightly on the basis of information available from the mine workings in that area. There is presently not sufficient evidence to move this contour to the west. The difference in reserve tonnage if this contour were moved would probably be less than 100,000 tons.

Ore Quality

In order to determine the quality of the ore reserves within the Hammondsville Mine, it was desirable to carefully sample the available diamond-drill core. One hundred and seven samples were sawed from the core from 17 different drill holes. These were submitted for chemical, mineralogical, and petrographic analysis. A selected few of these samples were submitted for more exhaustive analysis after flotation testing.

In addition, almost forty samples of core material were submitted for thin-section analysis to determine various information about the host rock, the ore, and the origin of the deposit. The results of these analyses have been discussed under

Discussion - continued

Thin Section and X-Ray Analysis in the section on Geology.

The only chemical test performed on the core samples was a determination of the acid solubility. This was done by the standard Johnson and Johnson procedure in the laboratory at Golden. The results are shown in Tables 2 through 18.

X-Ray diffraction analyses were performed on ground samples of rock. All peak heights reported in the tables were measured in centimeters above background directly from x-ray diffractograms. The principal peaks of the various minerals are reported so that, in the case of talc, chlorite, and mica, the relative height above background (intensity) of these minerals are roughly comparable to relative abundance of the three minerals. It should be pointed out that these numbers do not represent percentages of the various minerals.

The percentages of the various minerals, as determined optically, are reported in Tables 2 through 18 and represent the microscopic estimate of the amount of the mineral present on slides of the insoluble residues from chemical testing. The purpose for doing microscopic analyses on the insoluble residues was to eliminate the problem of identifying the abundant carbonates (other than by x-ray means). The residues were almost entirely silicates, mostly talc and chlorite. The differentiation between these two, as stated earlier, is very difficult

TABLE 2

X-RAY DIFFRACTION AND MICROSCOPIC DATA

Diamond Drill Hole 1-67-H

Interval (ft)	39.0-41.0	47.0-54.0	57.3-59.3
X-Ray Diffraction Peak Heights			
Talc	23.8	19.8	11.2
Tremolite-Actinolite	--	--	2.5
Chlorite	1.2	0.8	0.8
Quartz	--	--	0.7
Calcite	--	--	--
Dolomite	3.4	4.6	0.4
Magnesite	4.5	4.5	0.2
Mica	--	--	--
Microscopic Examination of Insoluble Portion			
% Platy Talc	42	56	36
% Foliated Talc	35	30	50
% Fibrous Talc	20	10	10
% F.G.A. Talc	<1	<1	<1
% Carbonate	3	3	3
% Dark Opaque	<1	<1	1
% Chlorite	--	--	--
% Quartz	--	--	--
% Tremolite-Actinolite	--	--	--
% Mica	--	--	--
% Acid Soluble	34.3	35.4	6.7

TABLE 3

X-RAY DIFFRACTION AND MICROSCOPIC DATA

Diamond Drill Hole 6-67-H

Interval (ft)	139.0-141.7	149.0-153.0	159.0-164.0	164.0-169.0	169.0-174.0	175.0-177.0
X-Ray Diffraction Peak Heights						
Talc	6.8	10.8	13.4	15.7	17.1	7.6
Tremolite-Actinolite	--	--	--	--	--	--
Chlorite	2.1	1.2	0.6	0.6	1.4	0.7
Quartz	0.4	--	--	--	2.5	2.1
Calcite	--	--	--	--	--	--
Dolomite	5.6	1.8	3.2	1.9	1.5	2.0
Magnesite	1.3	8.1	6.2	3.0	0.4	--
Mica	--	--	--	--	2.9	0.7
Microscopic Examination of Insoluble Portion						
% Platy Talc	36	40	34	36	47	44
% Foliated Talc	50	50	40	50	40	40
% Fibrous Talc	10	5	20	10	5	5
% F.G.A. Talc	<1	<1	<1	<1	<1	<1
% Carbonate	3	5	5	3	2	5
% Dark Opaque	1	<1	1	1	1	1
% Chlorite	--	--	--	--	--	--
% Quartz	--	--	--	--	--	--
% Tremolite-Actinolite	--	--	--	--	--	--
% Mica	--	--	--	--	10	5
% Acid Soluble	28.4	38.5	41.7	36.1	18.2	18.6

TABLE 4

X-RAY DIFFRACTION AND MICROSCOPIC DATA

Diamond Drill Hole 21-67-H

Interval (ft)	765.1-770.4
X-Ray Diffraction Peak Heights	
Talc	0.3
Tremolite-Actinolite	--
Chlorite	3.0
Quartz	4.8
Calcite	--
Dolomite	0.6
Magnesite	--
Mica	6.5
Microscopic Examination of Insoluble Portion	
% Platy Talc	2
% Foliated Talc	<1
% Fibrous Talc	<1
% F.G.A. Talc	<1
% Carbonate	5
% Dark Opaque	3
% Chlorite	--
% Quartz	10
% Tremolite-Actinolite	--
% Mica	80
% Acid Soluble	9.3

TABLE 6

X-RAY DIFFRACTION AND MICROSCOPIC DATA

Diamond Drill Hole 35-67-H

Interval (ft)	382.5-387.5	387.5-392.5	392.5-397.5	397.5-402.5	402.5-404.5	404.5-410.5
X-Ray Diffraction Peak Heights						
Talc	14.1	12.3	8.0	9.9	8.4	10.2
Tremolite Actinolite	--	--	--	--	--	--
Chlorite	1.2	2.9	3.6	4.2	1.5	3.1
Quartz	--	--	--	--	--	--
Calcite	--	--	--	--	--	--
Dolomite	1.5	1.7	1.5	1.2	1.7	2.1
Magnesite	4.6	3.4	6.1	--	0.2	2.5
Mica	--	--	--	--	--	--
Microscopic Examination of Insoluble Portion						
% Platy Talc	30	35	30	58	60	50
% Foliated Talc	52	39	47	30	30	36
% Fibrous Talc	10	15	20	10	10	10
% F.G.A. Talc	<1	<1	<1	<1	<1	<1
% Carbonate	7	10	3	<1	1	3
% Dark Opaque	1	1	<1	<1	<1	1
% Chlorite	--	--	--	2	--	--
% Quartz	--	--	--	--	--	--
% Tremolite-Actinolite	--	--	--	--	--	--
% Mica	--	--	--	--	--	--
% Acid Soluble	35.0	30.6	24.9	23.2	30.8	26.3

TABLE 7

X-RAY DIFFRACTION AND MICROSCOPIC DATA

Diamond Drill Hole 36-67-H

Interval (ft)	399.2-405.5	405.5-421.0	421.0-425.5	425.5-430.5	430.5-435.5	435.5-440.0	440.0-444.5	444.5-451.2	451.2-457.8	457.8-465.8
X-Ray Diffraction Peak Heights										
Talc	18.2	12.6	14.7	12.7	11.7	12.0	4.7	4.0	11.2	8.3
Tremolite-Actinolite	--	--	--	--	--	--	--	--	--	--
Chlorite	1.5	1.0	0.7	0.8	0.7	1.3	0.8	1.0	4.0	0.7
Quartz	--	--	--	--	--	--	--	--	--	--
Calcite	--	--	--	--	--	--	--	--	--	--
Dolomite	3.8	0.5	2.6	2.5	3.5	2.3	0.9	0.6	0.5	0.2
Magnesite	1.6	4.2	5.1	9.2	3.2	2.8	2.3	0.8	0.9	3.5
Mica	--	--	--	--	--	--	--	--	--	--
Microscopic Examination of Insoluble Portion										
% Platy Talc	10	5	20	30	30	40	40	36	79	50
% Foliated Talc	82	86	70	60	60	50	55	60	15	40
% Fibrous Talc	5	5	8	8	10	7	2	3	5	8
% F.G.A. Talc	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
% Carbonate	1	1	1	1	<1	3	3	1	1	1
% Dark Opaque	2	3	1	1	<1	<1	<1	<1	<1	<1
% Chlorite	--	--	--	--	--	--	--	--	--	--
% Quartz	--	--	--	--	--	--	--	--	--	--
% Tremolite-Actinolite	--	--	--	--	--	--	--	--	--	--
% Mica	--	--	--	--	--	--	--	--	--	--
% Acid Soluble	24.4	30.2	36.6	32.3	43.9	29.4	42.4	23.2	14.2	29.0

TABLE 8

X-RAY DIFFRACTION AND MICROSCOPIC DATA

Diamond Drill Hole 37-87-N

Interval (ft)	362.6-367.5	367.5-377.0	377.0-386.0	386.0-389.0	389.0-394.0	394.0-399.0	399.0-404.0	404.0-409.0	409.0-414.0	414.0-419.0	419.0-424.0	424.0-429.0	429.8-434.8
X-Ray Diffraction Peak Heights													
Talc	26.0	20.0	6.9	16.7	16.2	5.5	8.8	20.8	17.1	25.7	8.3	14.5	5.0
Tremolite-Actinolite	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorite	1.6	0.8	1.8	1.2	4.0	0.9	0.7	1.3	1.4	0.9	0.5	0.8	0.9
Quartz	--	--	2.3	--	--	--	--	--	--	--	--	--	--
Calcite	--	--	--	--	--	--	--	--	--	--	--	--	--
Dolomite	1.8	2.3	6.9	4.9	3.8	2.5	4.0	2.2	1.8	3.1	5.7	4.0	0.7
Magnesite	3.3	3.4	0.2	2.9	1.7	1.8	3.0	6.6	5.6	7.4	4.2	2.0	1.7
Mica	0.3	--	3.4	--	0.3	--	--	0.2	0.2	0.3	--	--	--
Microscopic Examination of Insoluble Portion													
% Platy Talc	36	48	34	32	50	40	47	38	33	47	35	35	37
% Foliated Talc	50	45	40	30	40	37	30	30	30	40	40	30	30
% Fibrous Talc	10	5	5	15	10	20	20	19	15	10	20	10	10
% P.G.A. Talc	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
% Carbonate	1	1	1	1	<1	2	3	2	2	3	5	5	2
% Dark Opaque	<1	<1	<1	1	<1	1	<1	<1	<1	<1	<1	<1	1
% Chlorite	--	--	--	--	--	--	--	--	--	--	--	--	--
% Quartz	--	--	10	--	--	--	--	--	--	--	--	--	--
% Tremolite-Actinolite	--	--	--	--	--	--	--	--	--	--	--	--	--
% Mica	--	--	10	1	--	--	--	--	--	--	--	--	--
% Acid Soluble	22.1	30.7	34.1	26.8	28.5	30.5	43.6	39.0	34.2	39.8	45.0	48.8	33.9

Interval (ft)	434.0-437.0	439.0-444.0	444.0-449.0	449.0-454.0	476.0-481.0	481.0-486.0	486.0-491.0	491.0-497.0	497.0-505.0	505.0-511.0	512.0-518.0	518.0-523.0	523.0-526.0
X-Ray Diffraction Peak Heights													
Talc	3.6	8.8	8.6	7.3	3.6	8.0	12.2	14.4	11.4	18.3	14.1	19.4	21.9
Tremolite-Actinolite	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorite	6.5	2.2	2.1	3.3	6.5	4.2	7.7	1.8	2.2	2.9	3.4	1.5	3.3
Quartz	--	--	--	--	--	--	--	--	--	--	--	--	--
Calcite	--	--	--	--	--	--	--	--	0.2	--	--	--	--
Dolomite	1.9	5.6	5.2	2.8	0.8	1.8	0.4	1.8	4.1	3.6	1.9	0.5	0.7
Magnesite	6.6	1.6	2.7	3.6	0.9	2.1	4.7	5.0	10.5	7.0	4.3	8.2	7.4
Mica	--	--	--	--	--	--	--	--	--	0.2	--	0.1	0.2
Microscopic Examination of Insoluble Portion													
% Platy Talc	33	42	44	32	55	55	49	49	45	60	40	35	44
% Foliated Talc	30	38	30	30	30	30	30	48	40	38	45	45	44
% Fibrous Talc	10	10	20	10	10	5	15	10	14	10	15	20	10
% P.G.A. Talc	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
% Carbonate	1	5	5	7	8	10	5	2	7	<1	<1	2	2
% Dark Opaque	<1	1	1	1	<1	1	1	<1	<1	<1	<1	1	<1
% Chlorite	--	--	--	--	--	--	--	--	--	--	--	--	--
% Quartz	--	--	--	--	--	--	--	--	--	--	--	--	--
% Tremolite-Actinolite	--	--	--	--	--	--	--	--	--	--	--	--	--
% Mica	--	--	--	--	--	--	--	--	--	--	--	--	--
% Acid Soluble	37.8	42.7	44.9	31.1	22.0	27.7	12.5	36.6	46.5	38.8	34.5	30.4	25.5

TABLE 9

X-RAY DIFFRACTION AND MICROSCOPIC DATA

Diamond Drill Hole 38-67-H

Interval (ft)	479.0-485.0	485.0-491.0	491.0-494.0	497.5-500.5	500.5-505.5	505.5-508.0	508.0-513.0	513.0-518.0	518.0-523.0	523.0-528.0	528.0-533.0	533.0-538.0	538.0-543.0	543.0-548.0	548.0-553.0
X-Ray Diffraction Peak Heights															
Talc	8.1	14.9	10.1	6.0	7.2	9.5	9.1	10.9	8.9	13.6	7.3	12.1	18.6	18.4	18.9
Tremolite-Actinolite	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.4
Chlorite	0.5	1.5	1.1	0.4	0.7	2.0	2.1	2.7	2.0	2.3	1.6	2.2	0.8	0.4	0.8
Quartz	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Calcite	--	--	--	--	--	--	--	--	--	--	--	--	0.2	--	--
Dolomite	4.3	2.2	1.0	0.6	--	0.7	0.4	0.3	4.2	8.0	2.3	3.4	12.4	13.0	4.7
Magnesite	1.2	5.0	2.7	7.4	4.2	6.1	6.7	2.2	4.3	4.5	0.6	--	0.5	4.6	1.3
Mica	--	--	--	--	--	--	--	--	--	0.1	--	--	0.2	0.1	0.3
Microscopic Examination of Insoluble Portion															
% Platy Talc	40	20	40	36	18	30	20	10	20	30	43	63	54	59	62
% Foliated Talc	50	66	54	50	70	58	58	72	55	50	55	30	35	30	30
% Fibrous Talc	8	10	5	10	10	10	10	10	20	20	10	5	10	10	5
% F.G.A. Talc	<1	2	<1	<1	<1	<1	10	5	3	<1	<1	<1	<1	<1	<1
% Carbonate	1	1	<1	3	1	1	1	2	1	2	2	1	<1	<1	3
% Dark Opaque	1	1	1	1	1	<1	1	1	1	1	1	1	<1	1	<1
% Chlorite	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
% Quartz	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
% Tremolite-Actinolite	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--
% Mica	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
% Acid Soluble	31.3	30.3	27.7	30.4	26.9	31.2	32.1	23.2	36.5	40.9	36.0	50.7	50.8	51.1	40.9

TABLE 10

X-RAY DIFFRACTION AND MICROSCOPIC DATA

Diamond Drill Hole 39-67-H

Interval (ft)	454.0-459.0	459.0-469.0	469.0-479.0	479.0-484.0	484.0-489.0	489.0-495.0	495.0-500.0	500.0-505.0	505.0-510.0	510.0-515.0	515.0-520.0	520.0-525.0	525.0-530.0	530.0-535.0	535.0-540.0	540.0-545.0
X-Ray Diffraction Peak Heights																
Talc	2.5	9.5	4.6	6.3	8.0	5.5	10.3	7.5	8.5	6.9	15.1	7.7	11.0	4.8	12.6	7.3
Tremolite-Actinolite	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorite	1.5	0.7	0.8	0.8	1.0	0.8	0.8	0.7	0.7	0.7	0.8	0.5	0.7	0.8	1.8	1.3
Quartz	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Calcite	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dolomite	2.0	7.4	1.7	2.1	2.5	0.6	1.5	1.7	2.7	2.3	1.3	2.1	3.3	1.4	6.5	4.5
Magnesite	1.2	3.5	4.0	7.0	4.0	6.6	1.4	7.4	3.4	3.2	5.3	3.0	4.8	1.4	8.5	7.3
Mica	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Microscopic Examination of Insoluble Portion																
% Platy Talc	30	10	50	50	60	34	38	57	50	20	30	45	44	49	44	40
% Foliated Talc	45	80	40	35	33	50	50	30	38	63	64	45	50	35	50	47
% Fibrous Talc	10	10	5	10	5	10	10	10	10	12	5	10	5	10	5	10
% F.G.A. Talc	<1	<1	<1	<1	<1	<1	1	<1	2	3	1	<1	<1	<1	<1	<1
% Carbonate	1	<1	5	5	2	5	1	3	<1	1	<1	<1	1	5	1	2
% Dark Opaque	2	<1	<1	<1	<1	1	<1	<1	<1	1	1	<1	<1	<1	<1	1
% Chlorite	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
% Quartz	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
% Tremolite-Actinolite	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
% Mica	10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
% Acid Soluble	35.0	49.8	45.7	29.7	37.2	33.4	41.1	36.0	41.7	38.8	32.2	42.2	38.3	30.6	36.8	45.8

TABLE 11

X-RAY DIFFRACTION AND MICROSCOPIC DATA

Diamond Drill Hole 40-67-H

Interval (ft)	488.0-496.0	496.0-505.0
X-Ray Diffraction Peak Heights		
Talc	16.8	10.5
Tremolite-Actinolite	--	--
Chlorite	2.2	3.8
Quartz	--	0.9
Calcite	--	--
Dolomite	5.4	2.1
Magnestie	4.4	4.4
Mica	--	0.7
Microscopic Examination of Insoluble Portion		
% Platy Talc	45	40
% Foliated Talc	40	49
% Fibrous Talc	5	10
% F.G.A. Talc	<1	<1
% Carbonate	<1	1
% Dark Opaque	<1	<1
% Chlorite	--	--
% Quartz	--	--
% Tremolite-Actinolite	--	--
% Mica	--	--
% Acid Soluble	33.8	33.5

TABLE 12

X-RAY DIFFRACTION AND MICROSCOPIC DATA

Diamond Drill Hole 41-67-H

Interval (ft)	594.0 599.0	599.0 604.0	604.0 608.5
X-Ray Diffraction Peak Heights			
Talc	13.1	18.2	18.7
Tremolite-Actinolite	--	--	--
Chlorite	6.2	3.0	2.3
Quartz	--	--	0.1
Calcite	--	--	--
Dolomite	1.9	6.5	1.2
Magnesite	4.2	3.8	2.5
Mica	0.2	0.2	0.4
Microscopic Examination of Insoluble Portion			
% Platy Talc	50	60	49
% Foliated Talc	44	34	36
% Fibrous Talc	5	5	10
% F.G.A. Talc	<1	<1	<1
% Carbonate	1	1	3
% Dark Opaque	<1	<1	1
% Chlorite	--	--	--
% Quartz	--	--	1
% Tremolite-Actinolite	--	--	--
% Mica	--	--	--
% Acid Soluble	25.3	33.7	29.0

TABLE 13

X-RAY DIFFRACTION AND MICROSCOPIC DATA

Diamond Drill Hole 44-67-H

Interval (ft)	299.9-304.0	304.0-309.0
X-Ray Diffraction Peak Heights		
Talc	0.2	0.6
Tremolite-Actinolite	0.5	0.4
Chlorite	1.3	2.3
Quartz	3.9	9.9
Calcite	--	--
Dolomite	--	--
Magnesite	--	--
Mica	6.0	11.2
Microscopic Examination of Insoluble Portion		
% Platy Talc	24	20
% Foliated Talc	5	10
% Fibrous Talc	2	2
% F.G.A. Talc	<1	<1
% Carbonate	1	3
% Dark Opaque	3	2
% Chlorite	10	10
% Quartz	5	3
% Tremolite-Actinolite	--	--
% Mica	50	50
% Acid Soluble	8.16	7.91

TABLE 14

X-RAY DIFFRACTION AND MICROSCOPIC DATA

Diamond Drill Hole 45-67-H

Interval (ft)	903.0-905.0
X-Ray Diffraction Peak Heights	
Talc	2.4
Tremolite-Actinolite	0.4
Chlorite	0.7
Quartz	2.4
Calcite	--
Dolomite	2.7
Magnesite	--
Mica	1.5
Microscopic Examination of Insoluble Portion	
% Platy Talc	35
% Foliated Talc	26
% Fibrous Talc	5
% F.G.A. Talc	<1
% Carbonate	<1
% Dark Opaque	1
% Chlorite	--
% Quartz	3
% Tremolite-Actinolite	--
% Mica	30
% Acid Soluble	21.3

TABLE 15

X-RAY DIFFRACTION AND MICROSCOPIC DATA

Diamond Drill Hole 46-68-H

Interval (ft)	580.0-586.0
X-Ray Diffraction Peak Heights	
Talc	0.7
Tremolite-Actinolite	--
Chlorite	1.0
Quartz	6.7
Calcite	--
Dolomite	0.3
Magnesite	--
Mica	7.4
Microscopic Examination of Insoluble Portion	
% Platy Talc	15
% Foliated Talc	7
% Fibrous Talc	3
% F.O.A. Talc	<1
% Carbonate	<1
% Dark Opaque	<1
% Chlorite	--
% Quartz	10
% Tremolite-Actinolite	--
% Mica	65
% Acid Soluble	13.1

TABLE 16

X-RAY DIFFRACTION AND MICROSCOPIC DATA

Diamond Drill Hole 49-68-H

Interval (ft)	973.0-976.5	980.0-986.5
X-Ray Diffraction Peak Heights		
Talc	2.2	0.6
Tremolite-Actinolite	0.6	--
Chlorite	1.6	1.1
Quartz	5.0	6.7
Calcite	0.7	--
Dolomite	--	0.2
Magnesite	--	--
Mica	3.5	8.4
Microscopic Examination of Insoluble Portion		
% Platy Talc	15	5
% Foliated Talc	12	2
% Fibrous Talc	1	1
% F.G.A. Talc	<1	<1
% Carbonate	2	1
% Dark Opaque	<1	1
% Chlorite	--	--
% Quartz	10	10
% Tremolite-Actinolite	--	--
% Mica	60	80
% Acid Soluble	10.9	12.6

TABLE 17

X-RAY DIFFRACTION AND MICROSCOPIC DATA

Diamond Drill Hole 50-68-H

Interval (ft)	889.0-893.0
X-Ray Diffraction Peak Heights	
Talc	0.5
Tremolite-Actinolite	--
Chlorite	0.8
Quartz	1.9
Calcite	--
Dolomite	0.5
Magnesite	--
Mica	2.0
Microscopic Examination of Insoluble Portion	
% Platy Talc	16
% Foliated Talc	10
% Fibrous T lc	3
% F.G.A. Talc	<1
% Carbonate	<1
% Dark Opaque	1
% Chlorite	10
% Quartz	10
% Tremolite-Actinolite	--
% Mica	50
% Acid Soluble	16.5

TABLE 18

X-RAY DIFFRACTION AND MICROSCOPIC DATA

Diamond Drill Hole 55-68-H

Interval (ft)	692.0-697.0	697.0-704.0	704.0-706.0	706.0-712.0
X-Ray Diffraction Peak Heights				
Talc	6.7	15.1	15.0	14.1
Tremolite-Actinolite	--	--	--	--
Chlorite	0.9	3.6	2.1	1.2
Quartz	0.2	--	--	--
Calcite	--	--	--	--
Dolomite	1.4	2.7	1.8	1.2
Magnesite	0.7	4.6	3.5	2.5
Mica	--	0.2	0.2	--
Microscopic Examination of Insoluble Portion				
% Platy Talc	45	50	50	40
% Foliated Talc	43	42	32	39
% Fibrous Talc	10	5	10	10
% F.G.A. Talc	<1	<1	<1	<1
% Carbonate	2	2	1	5
% Dark Opaque	<1	1	<1	1
% Chlorite	--	--	--	--
% Quartz	--	--	1	--
% Tremolite-Actinolite	--	--	--	--
% Mica	--	--	--	5
% Acid Soluble	41.5	30.5	34.8	24.2

Discussion - continued

and fine grains are impossible to differentiate optically.

To obtain percentages of the total sample for the various minerals identified optically, it is necessary to back-calculate from the percent of the rock which was soluble. This calculation was performed only for platy talc in this study as it is the only truly important constituent from the standpoint of ore reserves and quality.

The following table (Table 19) shows the results of the chemical, x-ray, and petrographic analyses.

Discussion - continued

Flotation Testing

Seven samples were chosen at random from the available drill-core samples for flotation testing. The results of color testing on the cleaner concentrate from these samples (Table 19) indicated that the color quality may deteriorate down-dip in the ore body and were reported by letter to Mr. William Ashton on 21 September 1970. At that time five more samples were selected from diamond-drill holes No. 38-67 and No. 39-67 to check this possibility in an area in which mining will soon commence.

It can be seen that the color values obtained from the seven samples from these two holes are below the standard value of 85.5 which has been set for the ore from the Hammondsville Mine.

Four samples were selected from the verde antique or so-called "serpentine" core of the ore body. These samples were from Diamond-Drill Hole 37-67. The purpose for taking these four samples was to ascertain if this material could be mined and blended with other ore from Vermont and still yield an acceptable product. This would increase the ore reserves if such a procedure were possible.

It appears (Table 19) that the verde antique core of the ore body could be, to some extent, mined and blended with the other ore with little deleterious effect on the color of the finished

TABLE 19

Mineralogy and Color of Selected Vermont Core Samples

Drill Hole	35-67	36-67	37-67	37-67*	37-67*	37-67*	37-67*	37-67	38-67	38-67	38-67	39-67	39-67	39-67	39-67	41-67
Interval	397.5-402.5	444.5-451-2	404-409	439.2-444	449-454	476-481	486-491	497-505	500.5-505.5	518-523	533-538	459-469	489-495	505-510	530-535	604-608.5
Talc	19.3	22.7	9.6	22.7	17.5	22.3	39.6	14.0	12.4	14.8	8.3	17.2	22.0	13.2	18.4	20.0
Chlorite	0.8	0.7	0.2	2.0	2.0	2.1	2.6	0.7	0.6	0.7	0.6	0.6	0.7	0.3	0.6	0.9
Dolomite	0.3	tr	tr	0.7	0.7	--	--	0.15	0.2	0.5	1.1	0.3	0.3	--	0.4	0.2
Magnesite	--	--	tr	0.4	0.3	--	tr	0.5	0.2	0.9	--	0.3	0.4	--	0.3	tr
Mica	0.2	0.3	--	--	0.3	--	0.4	--	0.3	0.2	tr	0.2	0.3	0.3	0.3	0.3
Color	77.12	83.88	85.44	71.78	74.00	78.42	74.78	82.58	80.24	74.78	75.82	80.24	82.32	81.02	82.06	78.42
% Cleaner concentrate	24.9	46.2	33.5	39.3	36.3	14.8	34.0	32.7	42.7	35.8	46.2	37.0	39.7	35.1	41.3	34.9
No. of cleaners	2	3	2	2	2	2	2	2	3	3	3	3	3	3	3	3
Principal size range in mm	>0.1	0.05-0.1	0.05-0.1	0.05-0.1	0.05-0.1	0.01-0.1	<0.1	0.05-0.1	0.01-0.05	0.01-0.05	0.01-0.05	0.05-0.1	0.05-0.1	0.05-0.1	0.05-0.1	>0.05

Note: Color (100% white)
Vermont = 86.22
Italian talc = 91.16
Calif. Pilot
Plant Composite = 90.90

Samples marked with an asterisk (*) are taken from the verde antique core of the ore body and this rock is not normally mined. The reason for the color difference is probably the fairly high percentage of chlorite in the cleaner concentrate.

product. This would require that it be a minor part of the feed to the flotation circuits. There are obviously, however, some zones within the verde antique core which would be very low in whiteness and thus unusable as ore. These are thought to be near the margins of this material. More sampling and testing would be necessary to fully evaluate this possiblity.

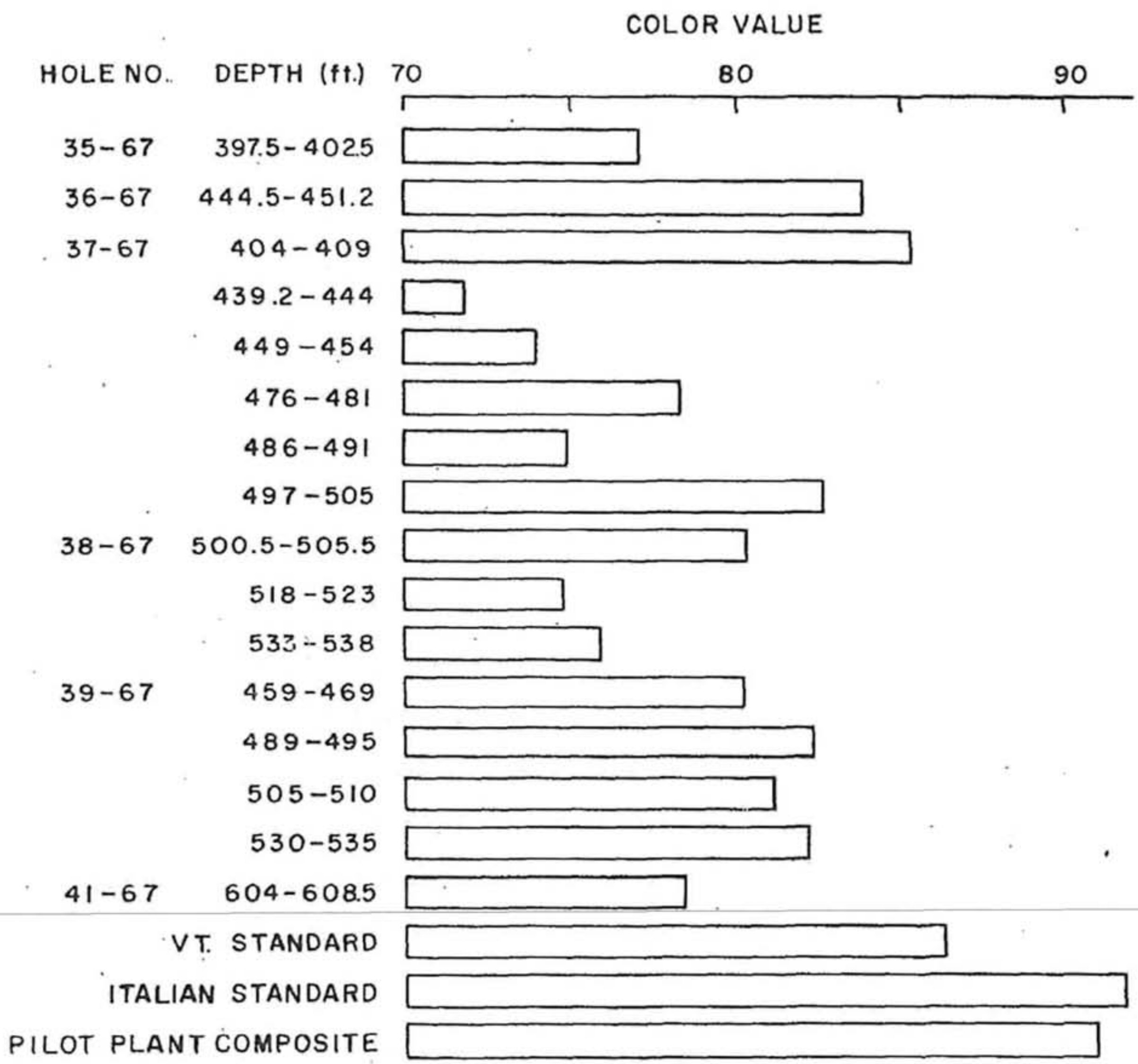
The color values obtained from the various samples are shown on the graph (Plate 6). The location of the holes and their position to the mine workings and ore body can be seen on the isopach Map of Talc Thicknesses (in pocket).

Drilling Recommendations

Of primary importance in any development drilling program is the acquisition of knowledge which will be useful for mining. Subordinate to this is the need to obtain information about the remainder of the ore body. There appears to be no immediate need for drilling out the entire deposit on closer centers unless the long-range plans of the company would be affected by having a more complete and accurate picture of the reserves and ore quality. At the present time, the ore reserves are classified as Indicated and it would take a great deal more drilling, probably three or four times the existing amount, to raise the classification of this reserve ore to the Measured category. It is felt that the

PLATE 6

COLORS OF SELECTED CLEANER CONCENTRATES
FROM HAMMONDSVILLE FLOTATION TESTING



Discussion - continued

existing drilling is adequate for a fair estimate of the ore reserves.

As has been pointed out in the section on Ore Quality, there is some concern that the color may deteriorate down-dip within the ore body. Drilling to obtain more information on this problem seems to be quite important. There is no doubt that the management at Windsor Minerals will be in a better position to lay out these holes than the Research Institute but our ideas are presented here for their evaluation. Eight diamond drill holes have been suggested on the 860 Level (see Proposed Diamond Drilling 30-Scale overlay map in pocket). These holes will not only allow evaluation of the quality of the talc below the 860 Level but will be of great assistance in mine planning for the next level down (770 Level ?). In order to evaluate the quality of the ore insofar as product color goes, these holes should be diamond drilled. The core in the ore zones should be sawed lengthwise and half should be used for the color assay. The use of a core splitter is not recommended because of the nature of the ore. It tends to exfoliate in a splitter and for this reason, a good split is impossible to obtain. It may be desirable to utilize the entire core for assay but this is often a mistake as more information is desired at a later date and duplicate holes might have to be drilled.

Discussion - continued

The location of these holes is shown on both the overlay plan (Proposed Diamond Drilling) and on Cross-Sections J, L, and N. These holes can either be drilled vertically or at 90 degrees to the schistosity (the dip of the ore). The proposed depths are shown on the overlay but each hole should be drilled at least 20 feet into the quartz-biotite schist to be certain that the foot-wall, and not a cinder, has been penetrated.

In addition to the above drilling, some surface holes seem called for. This would not only be for clarification of the color question but for mine planning on the next level. On the basis of the apparent physical shape of the ore body (see the Map of Talc Thicknesses, Plate 1) several areas can be seen in which drill holes would furnish a maximum of information. Four of these are listed below:

1. near the center of the triangle formed by holes 58-68, 6-66, and 57-68.

2. halfway between holes 58-68 and 10-66. This would be to evaluate the width of the apparent pinchout as well as ore quality. The hole should be placed somewhat to the east of the pinchout zone if possible.

3. approximately 200 feet west of hole 38-67. This should be about in the thickest part of the ore body and would be very important in evaluating ore quality.

4. approximately 225 feet N 40° E of Hole 10-66. This hole would evaluate not only color but the shape and size of the thickest portion of the ore body.

Discussion - continued

These holes, considered by us to be a bare minimum necessary for reasonable mine planning for the next five years or so, should give a maximum of information return for a rather limited amount of drilling. The philosophy behind the locating of these holes is readily applicable to the location of several more, if they seem necessary.

Any drill holes which are drilled to depths of more than 300 feet should be surveyed. It is not uncommon for drill holes in this type of rock to deviate from the vertical in less than 200 feet. The Tro-Pari method of surveying is probably the most practical; Eastman is probably better but more expensive.

It can be seen from Cross Section F that something of long-range interest takes place around Drill Hole 57-68. Not only does the thickness of the ore intercept increase but there is apparently some structural change in that area. The ore body may undergo a reversal of dip in this area or it may have been faulted somewhat. More drilling will be necessary in this area and to the north to answer these questions.

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APPENDIX

EXHIBIT 1

MEGASCOPIC DESCRIPTION OF CORE SAMPLES

DDH 1-67 H

Interval (ft)	Description
39-41	Light green talcose marble. CO_3 pink, about 50%. Overlain by 3 in. quartz vein, overlain by 30 ft of quartz-biotite schist. Recovery about 100%.
47-54	Light greenish gray to cream talcose marble. CO_3 about 50%. Color of CO_3 cream colored to flesh colored in areas. CO_3 mostly in small blebs but some ½ in. knots are present. Over and underlain by "blackwall" chlorite-biotite schist plus quartz-biotite schist. Recovery 100%.
57.3-59.3	Dark green chloritic-talc schist. Overlain and underlain by "blackwall" and quartz-biotite schist. Recovery 100%.

Exhibit 1 - continued

DDH 38-67 H

Interval (ft)	Description
479-485	Mottled dark greenish gray and white talc-carbonate schist. CO_3 about 25%. Some apple green talc. Overlain by a quartz-biotite-chlorite schist containing minor amounts of carbonate. Occasional fractures perpendicular to schistosity are filled with carbonate. Recovery 62%.
485-491	Mottled dark greenish gray and gray talc carbonate schist. CO_3 about 25%. Recovery 92%.
491-494	Dark grayish green mottled talc-carbonate schist. Some minor blebs and stringers of apple green talc. CO_3 about 25%. Sharp contact on bottom of talcose zone with green "basalt" containing minor little veinlets of carbonate. Color grades in "basalt" from light green within 2 in. of contact to dark green. Sample taken for thin section. No visible alteration of talc at contact. Recovery 100%.
497.5-500.5	Mottled dark grayish green and gray talc-carbonate. At hanging wall contact there is no visible alteration of the talc rock. The "basalt" is lighter in color at the contact. "Basalt" also has some flow structure roughly parallel to "basalt"-talc contact plane. Possibly a mudstone. Recovery 100%.
500.5-505.5	Mottled dark grayish green talc-carbonate. CO_3 in veins and blebs about 25 % of total rock. Recovery 100%.
505.5-508	Green and white mottled talc-carbonate. CO_3 about 50%. Talc present as both light apple green and dark green varieties. Recovery 32%.
508-513	Mottled dark green and gray talc-carbonate. CO_3 about 25%. Recovery 100%.

Exhibit 1 - continued

DDH 38-67 H (continued)

Interval (ft)	Description
518-518	Mottled dark green and gray talc-carbonate. CO_3 about 25%. One vertical vein of CO_3 8 in. long bounded by apple green talc. Recovery 100%.
518-523	Mottled dark green and gray talc-carbonate. CO_3 about 25%. Generally not distinct "eyes" or augen as in DDH 39. Recovery 100%.
523-528	Dark green and gray mottled talcose marble. CO_3 greater than 50% in swirls. Recovery 100%.
528-533	Dark green and gray mottled talc-carbonate. CO_3 about 20%. Recovery 100%.
533-538	Mottled dark green and gray talcose marble. Up tc 6 in. zones of dirty spotted carbonate present. CO_3 about 50%. Note: Recovery 100% (from 532.4 ft to 552.4 ft = 20.9 ft! about 105% recovery) Labelling in box probably wrong.
538-543	Mottled gray and dark green talcose marble. CO_3 greater than 50% and contains some dark spots (dirty). Recovery 100%.
543-548	Spotted and mottled gray to greenish gray talcose (?) marble. CO_3 probably greater than 75%. $\frac{1}{4}$ in. spots of CO_3 in chloritic or talcose zones. Recovery 100%.
548-553	Gray to greenish gray talcose marble. CO_3 less than 50%. Rock has mottled and spotty appearance. Underlying rock grades from 6-8 in. of chlorite schist into an almost gneissic quartz-biotite (chlorite?) schist. 1 in. of apple green to white talc very close to the contact. This could indicate alteration of host rock. Recovery 100%.

Exhibit 1 - continued

DDH 6-67 H

Interval (ft)	Description
139-141.7	Dark greenish gray talc-marble schist CO_3 about 50%. CO_3 is pink in color, probably dolomite. Crystals up to 3/8 in. in diameter, curved cleavages. Overlain and underlain by quartz-biotite schist. Recovery 82%.
149-153	Dark greenish gray talcose marble to calcareous talc schist. CO_3 25-50% in blebs and veins ($2\frac{1}{2}$ in). Color cream to light flesh color. Recovery 58%.
159-164	Dark gray to light gray green talc schist containing about 25% carbonate. CO_3 is cream to flesh colored. Recovery about 100%.
164-169	Light to dark greenish gray schistose talc marble. CO_3 about 50% in flesh to cream colored blebs and stringers. Recovery 100%.
169-174	Chloritic talcose marble. CO_3 about 50%. CO_3 in flesh colored blebs ($\frac{1}{2}$ in.) and splotches. Recovery about 30%.
	Note: 173.5-175 = quartz-biotite schist 50% recovery.
175-177	2 ft of light greenish gray talc-chlorite schist. Some rectangular spots of chlorite within the talc saved for thin section. Overlain by quartz-biotite schist (1 ft) and underlain by quartzose biotite-chlorite schist. Recovery 100%.

Exhibit 1 - continued

DDH 21-67 H

Interval (ft)	Description
765.1-770.4	Contorted dark green biotite-chlorite schist. Some small blebs (2 mm) of carbonate. No obvious talc present. Pretty uniform - no actinolitic rocks seen in this interval. Underlain by bull quartz and quartz-biotite schist to gneiss. Overlain by 40 ft of chlorite schist which contains pink garnets (→5 mm) in zones. Some thin (1-5 mm) calcite and quartz veins. Recovery 98%.

Exhibit 1 - continued

DDH 34-67 H

Interval (ft)	Description
507-512	Black pyritic quartz-biotite schist overlying 3 in. of chlorite-talc schist, overlaying 5 ft of talcose marble. CO_3 flesh colored. CO_3 about 50%. Recovery about 100%.
512-517	Light to dark greenish gray talcose marble. CO_3 about 50%, flesh colored to cream colored. Recovery about 100%.
517-522	Light to dark greenish gray talcose marble. CO_3 about 50%, flesh to cream colored. Recovery about 100%.
522-527	Light to dark green talcose marble to calcareous-talc schist. CO_3 25-50% in flesh to cream colored blebs and swirls. Recovery about 100%.
527-532	Light to dark greenish gray talc marble. CO_3 30-50% in flesh to cream colored blebs and swirls. Crystals of CO_3 up to ½ in. in diameter. Recovery 100%.
532-537	Light green talcose marble. CO_3 about 50% except for 8 in. of solid carbonate at 535 ft. CO_3 cream colored. Recovery 100%.
537-542	Light to dark greenish gray talcose marble. Base grades into deformed biotitic schist containing many small blebs (<1 mm) and veinlets (<1 mm) of calcite. This grades down into a garnetiferous, epidotic quartz-biotite schist. Hole bottom at 554 ft. Recovery 100%

Exhibit 1 - continued

DDH 35-67 H

Interval (ft)	Description
382.5-387.5	Pinkish green to light greenish gray talcose marble. CO_3 over 50%. CO_3 is flesh to cream colored non-calcite. Talc mostly light apple green variety. Chlorite schist with minor biotite hanging wall (1 ft) overlain by pinkish, dark gray quartz-biotite schist containing some garnets. Recovery 100%.
387.5-392.5	Light greenish gray talcose marble. CO_3 is flesh to cream colored. Grades from apple green talc at top to darker (chloritic) at bottom. Contains 1 ft of dark green chlorite schist with blebs of white talc. Recovery 100%.
392.5-397.5	2 ft light greenish gray talcose marble (CO_3>50%) underlain by 3 ft of dark green chlorite schist containing (<10%) talc blebs and spots. Recovery 100%.
397.5-402.5	Dark green chlorite containing laths and cubes of talc (white) and CO_3 (<10%). Some of this section is the lighter talcose marble $CO_3 \rightarrow 30\%$. Recovery 100%.
402.5-404.5	Light gray talcose marble. CO_3 white to flesh colored. CO_3 >50%. Core badly ground up. Recovery 50%.
404.5-410.5	Light to dark grayish green talcose marble. CO_3 about 30%. Underlain by 1.5 ft of crenulated chlorite schist ("blackwall") which becomes biotitic and grades into a garnetiferous quartz-biotite schist. Recovery 100%.

Exhibit 1 - continued

DDH 36-67 H

Interval (ft)	Description
399.2-405.5	Top part almost solid chloritic talc schist. Below this is a spotted to mottled talc marble. CO_3 augen have black specks or "nuclei" overlain by chlorite schist with some talc. Overlain by quartz-biotite schist. Recovery 86%.
405.5-421	Mottled dark grayish green and cream talcose marble. CO_3 about 50%. Recovery 43%.
421.5-425.5	Mottled dark greenish gray and cream talcose marble. CO_3 up to 50% average. One 2 in. band present - white rather than fleshy cream color. Recovery 100%.
425.5-430.5	Mottled light green, dark greenish gray and cream talcose marble. CO_3 about 30%. Some light apple green talc stringers. Recovery 100%.
430.5-435.5	Mottled dark greenish gray and cream talcose marble. CO_3 about 25%. Recovery 100%.
435.5-440	Mottled and banded dark greenish gray and cream talcose marble. CO_3 about 50%. Some "algal" structures at 437-438 ft. Recovery 100%.
440-444.5	Mottled dark greenish gray and cream talcose marble. CO_3 about 50%. Recovery 73%.
444.5-451.2	Mottled dark green and cream talc carbonate (marble) underlain by at least 2 ft of dark green pure talc-chlorite schist. CO_3 in upper zone less than 25%. Recovery 70%.

Exhibit 1 - continued

DDH 36-67 H (continued)

Interval (ft)	Description
451.2-457.8	Dark and light-green banded talc-chlorite schist with about 2 ft of talcose chloritic marble in center of section. Bands of talc are the light apple green. Core mostly "washers" of schist. Recovery 70%.
457.8-465.8	Mottled dark greenish gray talcose marble. CO_3 about 50%. Underlain by 6 in. of pure chlorite schist (sharp contact) underlain gradually by biotite-chlorite schist (6 in.) underlain by calcareous quartz-biotite schist. 6 ft down is a 1 ft layer of quartzite with a few biotite stringers. Quartz-biotite schist below this. Hole bottom 477.6 ft. Recovery 100%.

Exhibit 1 - continued

DDH 37-67 H

Interval (ft)	Description
362.6-367.5	Black quartz-biotite schist, 1 in. quartzite, 2 ft black quartz-biotite schist, 3 in. chlorite-biotite (?) schist, 1.5 ft very dark green chloritic talc, underlain by mottled and spotted dark greenish gray and cream talcose marble. CO_3 in this portion about 50%. Recovery 95+%.
367.5-377	Mottled to banded, light to dark green and grayish green, talcose marble, CO_3 about 30%. Some of the augen of carbonate have dark nuclei. Recovery 61%.
377-386	2 ft of black talcose (?) or chloritic (?) biotite "cinder" overlain by a light greenish gray talc carbonate gneiss. CO_3 about 50%. Talc is present as the light apple green in many zones. Recovery 61%.
386-389	Mottled, spotty dark greenish gray and cream talc marble. CO_3 greater than 50%. Recovery 100%.
389-394	Banded and mottled dark gray to dark greenish gray chloritic talc marble. CO_3 about 25%. Chlorite abundant. Recovery 100%.
394-399	Mottled to banded, light to dark greenish gray talc marble with some round single crystal blebs of carbonate. CO_3 probably slightly less than 50%. Some light apple green talc present. Recovery 100%.
399-404	Spotted to mottled, light to dark greenish gray talc marble. Much light green talc. Carbonate probably slightly less than 50%. Some specks of biotite dispersed here and there in the core. Recovery 100%.

Exhibit 1 - continued

DDH 37-67 H (continued

Interval (ft)	Description
404-409	Mottled dark greenish gray and cream talc marble. CO_3 about 35%. Recovery 100%.
409-414	Splotchy dark greenish gray talc marble. CO_3 occurs as blebs ~1 in. and a couple of 2 in. zones of coarsely crystalline CO_3. A couple of thin zones of apple green talc. Recovery 100%.
414-419	Mottled dark greenish gray and gray talcose marble. CO_3 about 25%. Recovery 100%.
419-424	Gray to dark greenish gray talcose chloritic marble. CO_3 probably greater than 50%. Recovery 100%.
424-429	Mottled dark green and gray talcose chloritic marble. CO_3 probably about 50% in bands and swirls. Sort of a gray verde antique. Recovery 100%.
429-434	Dark green talcose chloritic marble. CO_3 probably 10% or less. Chlorite abundant. Recovery 100%.
434-439.2	Dark green to gray talcose, chloritic marble. Carbonate less than 25%. Recovery 100%
439.2-491	No sample - Verde antique marble with a few ¼ in. talc veins within 9 ft of the top and bottom of this zone. The green matrix appears to be mostly chlorite, bands and swirls of carbonate. Some minor talc. Looks a lot like the "talc zone" in DDH 38-67 H. Recovery 100%.
439.2-444	Mottled dark green and white talc-chlorite marble. Verde antique. Fairly hard. Recovery 100%.

Exhibit 1 - continued

DDH 37-67 H (continued)

Interval (ft)	Description
444-449	Dark green and white talc-chlorite marble. CO_3 >50%. Fairly hard rock. Recovery 100%.
449-454	Dark green and mottled white talc-chlorite marble. Verde antique. CO_3 <50%. Some small "cut and fill" type structures at 451 ft. Recovery 100%.
476-481	Dark green talcose chlorite marble. Verde antique. Minor talc content. Carbonate in white streaks. Recovery 100%.
481-486	Dark green talcose chlorite marble. Verde antique. CO_3 in white bands and swirls about 25-30%. Recovery 100%.
486-491	Dark green talcose chlorite marble. Grades down fairly quickly into light to dark greenish gray talc marble. CO_3 in bands, swirls and spots. Some minor veinlets of talc. Recovery 100%.
491-497	Mottled and banded talcose marble. Grades from light grayish green at the bottom into dark green verde antique at the top. Talc content decreases upwards, chlorite and carbonate content increases. Carbonates found in bands and veins. Recovery 100%.
497-505	Mottled dark greenish gray talcose marble. CO_3 about 25%. Some structures which resemble snail fossils (see mark at 502). Recovery 67%.
505-513	Dark grayish green mottled talcose marble. CO_3 about 50%. Many structures which look like relict sedimentary features. Recovery 67%.

Exhibit 1 - continued

DDH 37-67 H (continued)

Interval (ft)	Description
513-518	2 in. dark green mudstone at 515.2 same as in DDH 38 at 494 ft. No alteration on it or around it. Core is dark grayish green and gray talcose marble. CO_3 about 50%. Recovery 100%.
518-523	Dark greenish gray talc schist. Carbonate probably up to 25%. Intersperses throughout the talc. Recovery 100%.
528.2-523	Dark green talc schist with some minor (<25%) carbonate blebs and mottling. Some ½ in. veinlets of apple green talc. Underlain by 3 ft of impure, muddy, biotitic chlorite schist which grades into a quartz-biotite schist. Recovery 100%.

Exhibit 1 - continued

DDH 39-67 H

Interval (ft)	Description
454-459	Dark gray talcose chlorite schist and white carbonate sections up to 2 in. Overlain by quartz-biotite schist which has bands of quartzite up to 2 in. thick present. No immediately obvious difference between the hanging wall (this sample) and the footwall rocks. Recovery 20%.
459-469	White to greenish gray chloritic talc schist. Some carbonate augen. Recovery 45%.
469-479	White to greenish gray talc schist. Recovery 45%.
479-484	Gray to greenish gray calcareous talc schist. Augen of carbonate up to 1 in. diameter. CO_3 about 25%. Recovery 84%.
484-489	Gray to greenish gray talc schist. Augen of carbonate up to 1 in. diameter. CO_3 about 25%. Recovery 84%.
489-495	Gray to greenish talc-carbonate schist. CO_3 up to 50%. Augen of CO_3 up to 1 in. diameter. Recovery 84%.
495-500	Dark gray to greenish gray talc-carbonate schist. CO_3 about 25-40% of rocks. Some small nuclei (dark) in the white CO_3 augen which are up to 3/4 in. in diameter. Recovery 100%.
500-505	Dark gray to greenish gray talc-carbonate schist. CO_3 $\rightarrow$50% with augen up to 1 in. Recovery 100%.
505-510	Dark gray to greenish gray talc-carbonate schist. Augen smaller and more plentiful. CO_3 $\rightarrow$50%. Some almost clear apple green translucent talc present. Recovery 100%.

Exhibit 1 - continued

DDH 39-67 H (continued)

Interval (ft)	Description
510-515	Dark gray to greenish gray talc-carbonate schist. CO_3 →50%. Some translucent apple green talc present. Recovery 100%.
515-520	Dark bluish gray to greenish gray talc-carbonate schist. Mottled with small (½ in.) augen of carbonate some of which have black "nuclei". Recovery 100%.
520-525	Bluish gray to greenish gray talc-carbonate schist. CO_3 augen about 25-30% of rock. Contains a couple of 1 in. bands of apple green translucent talc. Recovery 100%.
525-530	Bluish gray to greenish gray talc-carbonate schist. Some ½ in. augen of CO_3 contains black "nuclei". CO_3 about 30-40%. Recovery 100%.
530-535	Banded dark bluisn to greenish gray and white to gray talc-carbonate schist. Almost gneissic. CO_3 about 50%. Recovery 100%.
535-540	Dark greenish gray talc-carbonate schist. Crystals of carbonate →½ in. CO_3 about 50% of rock.
540-545	Mottled greenish gray and white talc-carbonate schist. About 50% CO_3 in bands and blebs. Some of the CO_3 augen (→½ in.) have dark "nuclei". Recovery 100%.
545-549	Grades from banded and mottled white and greenish gray talc-carbonate into 6 in. of extremely soft talc-chlorite schist. This is underlain by vermicular chlorite schist. 2 in. of coarse grained quartzite at base of talc and chlorite. Beneath this is a quartz-biotite schist with distinct bands of quartz plus mixed zones quartz and biotite. Recovery 100%.

Exhibit 1 - continued

DDH 40-67 H

Interval (ft)	Description
488-496	Green to brownish green chlorite-talc schist. Carbonates ~25%. Recovery 39%.
496-505	Green to brownish talc-chlorite schist. Up to 25% carbonates. Recovery 30%.

Exhibit 1 - continued

DDH 41-67 H

Interval (ft)	Description
594-599	Grayish green talc schist. Minor carbonates. Recovery 100%.
599-604	Dark greenish brown chloritic talc schist. Carbonate ~25%. Recovery 100%.
604-608½	Greenish gray chloritic talc schist. (Chlorite about equals talc in amount.) Abundant carbonate. (Up to 25%). Recovery 100%.

Exhibit 1 - continued

DDH 44-67 H

Interval (ft)	Description
299-304	Black to dark greenish brown chloritic biotite schist. Non talcose. Recovery 100%.
304-309	Dark brown to greenish brown chlorite schist. Some biotite. Some thin stringers of carbonate and quartzite. Non talcose. Recovery 100%.

Exhibit 1 - continued

DDH 45-67 H

Interval (ft)	Description
903-905	Dark brown quartz-biotite schist with some ½ in. crystals of green actinolite. 4 in. of coarse grained quartzite. Non talcose. Recovery 15%.

Exhibit 1 - continued

DDH 46-68 H

Interval (ft)	Description
580-586	Dark brown chlorite schist. Two light colored ¼ in. zones. Not talcose. Some carbonates. Recovery 100%.

Exhibit 1 - continued

DDH 49-68 H

Interval (ft)	Description
973-976	Gray to black chlorite schist. Coarse grained. Some greenish zones. Recovery 100%.
980-986½	Dark grayish brown biotitic chlorite schist. One 2 in. quartzite stringer. Non-talcose. Recovery 100%.

Exhibit 1 - continued

DDH 50-68 H

Interval (ft)	Description
889-893	Dark gray to black chlorite schist. Carbonates →25%. Not talcose. Recovery 37%.

Exhibit 1 - continued

DDH 55-68 H

Interval (ft)	Description
692-697	Green to brownish green chloritic talc schist. Carbonate ~25%. Recovery 71%.
697-704	Brownish green to grayish green chloritic (25%) talc (50%) schist. About 25% carbonate. Recovery 71%.
704-706	Talcose gray to grayish brown chlorite schist. Carbonate up to 50% in zones. Recovery 71%.
706-712	Dark greenish gray talc marble schist. CO_3 varies from about 50% near top to less than 10% near the base. Much apple green talc near base. Underlain by 1 ft of talc-chlorite-biotite schist underlain by quartz-biotite schist. Recovery 84%.

EXHIBIT 2

PETROGRAPHIC EXAMINATIONS

Glossary: The following definitions of terms used to describe rocks and thin sections are furnished for the convenience of the reader.

Foliation -- A laminated structure resulting from segregation of different minerals into parallel layers.

Schistosity -- Synonomous with foliation when used to describe the structure of schists.

Lineation -- Narrow streaks of minerals, or mineral fragments, strung through a rock as discontinuous but parallel lines.

Spar Type Carbonates -- A carbonate particle that has not been granulated, i.e., uncrushed (or possibly epigenetic) carbonate particle.

Granulated Carbonate -- Carbonate particles that are derived from the crushing of larger spar type carbonate particles.

Augen -- Large lenticular mineral grains or aggregates of minerals which in cross-section have the shape of an eye.

Retrogressive Metamorphism -- Includes the changes that take place when a rock, that was formed by relatively intense metamorphism, is altered within an environment of lower-grade metamorphism.

Gneiss -- A coarse-grained rock in which bands rich in granular minerals alternate with bands in which schistose minerals predominate.

Schist -- A medium- or coarse-grained metamorphic rock with subparallel orientation of micaceous minerals which dominate its composition.

Marble -- A metamorphic rock composed essentially of calcite and/or dolomite and/or magnesite.

Exhibit 2 - continued

Curved Trains of Minerals -- This term is used to indicate a situation in which finer-grained schistose components are bent around a larger mineral grain or group of larger mineral grains.

Schistose Marble -- A rock containing more than 50% carbonate particles intermixed with seams of schistose material.

Marble Schist -- A rock containing less than 50% carbonate particles intermixed with large areas or seams of schistose material.

Sample Descriptions: The specimens submitted for thin-section analysis are described below. Each rock is described macroscopically, then the details of the petrographic analysis follow. The numbers applied to the samples (such as 2H-301) indicate the drill-hole number from which the sample was taken (i.e., drill hole 2-67H) and the depth within that hole at which the sample was taken (i.e., 301 feet). Eleven holes were drilled in 1966 (1-66H through 11-66H) but the core was not retained. In 1967, drilling commenced again with hole No. 1-67H. All of the sample numbers used herein refer to drilling during 1967 and 1968.

Exhibit 2 - continued

Specimen 2H-301:

In hand specimen this is a grayish black rock exhibiting a schistose structure. The grayish black groundmass is fine grained and contains some light brownish gray particles, possibly garnet, ranging in size from 1.0 to 6.0 mm. The schistose structure appears in curved mineral trains around these larger particles giving the rock an augen schist appearance.

In thin section the rock consists of a moderate amount of lineated mica laths (possibly biotite) intermixed with a moderate amount of granulated quartz and a minor amount of granulated feldspar particles (Photomicrograph 1A). All minerals show some degree of straining. The light brownish gray phenocrysts noted in hand specimen appear as fine-grained, opaque, clay-like particles with chlorite inclusions progressing from the contact with the host rock inward (Photomicrograph 1B). It is possible these phenocrysts may be highly weathered garnet crystals that have undergone roll type abrasion during metamorphism. This rock may be classified as a garnetiferous quartz-biotite augen schist.

1A

1B.

Photomicrograph No. 1A. Specimen 2H-301 showing granulated quartz grains and lineated biotite laths forming a schistose texture.

Photomicrograph No. 1B. Specimen 2H-301 showing a highly weathered garnet? crystal with an irregular chlorite inclusion (portion outlined with dashed line). The lower quarter of the photomicrograph is another portion of the host rock similar to photomicrograph No. 1A.

Scale
0.1 mm

Crossed polarizers

Exhibit 2 - continued

Specimen 6H-139:

In hand specimen this is a medium light gray porphyritic rock containing many moderate yellowish brown carbonate particles that range in size from 1.0 mm to 2.5 cm. Grayish black schistose seams ranging from 1.0 to 4.0 mm wide are present in the rock as curved mineral trains around the larger carbonate particles. Some embayment of these dark schistose seams into the carbonate particles is apparent.

In thin section the rock consists of a major amount of carbonate particles ranging from granulated masses having grain sizes ranging from 0.1 to 1.0 mm to large particles measuring over 1 cm. These are the phenocrysts noted in hand specimen. There is a moderate amount of chlorite occurring as laminar seam fillings (Photomicrograph 2). These are probably the dark gray seams noted in hand specimen. A moderate amount of talc was noted that occurs mainly as fine-grained foliated masses intermixed with fine-grained chlorite. This probably makes up the bulk of the medium light gray host rock noted in hand specimen. Some platy talc grains were noted in the foliated fine-grained talc and chlorite intermixture. These plates were elongated and tended to subparallel the foliated texture. This rock may be classified as an schistose augen marble.

Photomicrograph No. 2. Specimen 6H-139 showing a foliated mixture of talc and chlorite (A), a chlorite seam (B) and variable sized carbonate particles (C).

Scale
0.1 mm

Crossed polarizers

Exhibit 2 - continued

Specimen 6H-141:

In hand specimen this is a medium light gray rock exhibiting curved mineral trains of schistose material around grayish orange carbonate eyes ranging from 3.0 mm to 1.5 cm. Thin grayish black seams were noted in the rock that parallel the foliation and are in contact with most of the phenocrysts.

In thin section the rock consists of variable sized carbonate particles, some ranging over 1.0 cm, set in a fine-grained foliated matrix of intermixed talc and chlorite. These are probably the dark seams noted in hand specimen. Most platy talc occurs as elongated particles subparalleling the schistosity of the fine-grained talc-chlorite mixture. A few individual talc plates were noted that were surrounded by the curved mineral trains (Photomicrograph 3). This rock may be classified as a marble augen schist.

Photomicrograph No. 3. Specimen 6H-141 showing irregular platy talc grains (A) set in a fine grained foliated matrix of talc and chlorite (B). Note curved mineral trains of the fine grained talc and chlorite intermixture around the platy talc grains.

Scale
0.1 mm

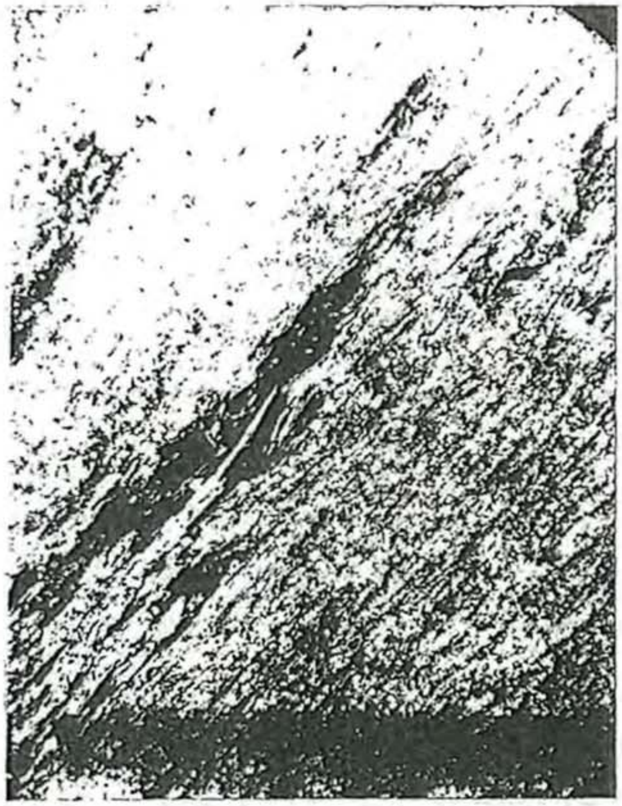
Crossed polarizers

Exhibit 2 - continued

Specimen 6H-150:

In hand specimen this rock is characterized by a large, fine-grained, bluish gray to bluish white, dense zone surrounded by pinkish gray carbonate eyes about 6.0 mm in diameter. These augen are surrounded by many grayish black schistose curved mineral trains.

In thin section the rock consists of a major amount of fine-grained foliated talc that is probably intermixed with fine-grained chlorite. Some platy talc was noted that occurred as elongated particles and paralleled the foliation (Photomicrograph 4). The carbonate particles in the rock occurred as fine-grained aggregates and as relatively large crystals. Some fine-grained carbonate may be intermixed with the fine-grained talc and chlorite. Chlorite was also noted concentrated in schistose curved mineral trains throughout the rock. This rock may be classified as an augen marble schist.



Photomicrograph No. 4. Specimen 6H-150 showing elongated platy talc grains (darker areas) set in a fine grained foliated mixture of talc and chlorite.

Scale

0.1 mm

Crossed polarizers

Exhibit 2 - continued

Specimen 6H-167:

In hand specimen this is a greenish gray schistose rock with a bluish white band ranging from 1.0 cm to 2.0 cm wide. One large white carbonate grain was noted that measured 1.0 cm by 0.5 cm. The schistosity curved around this carbonate grain.

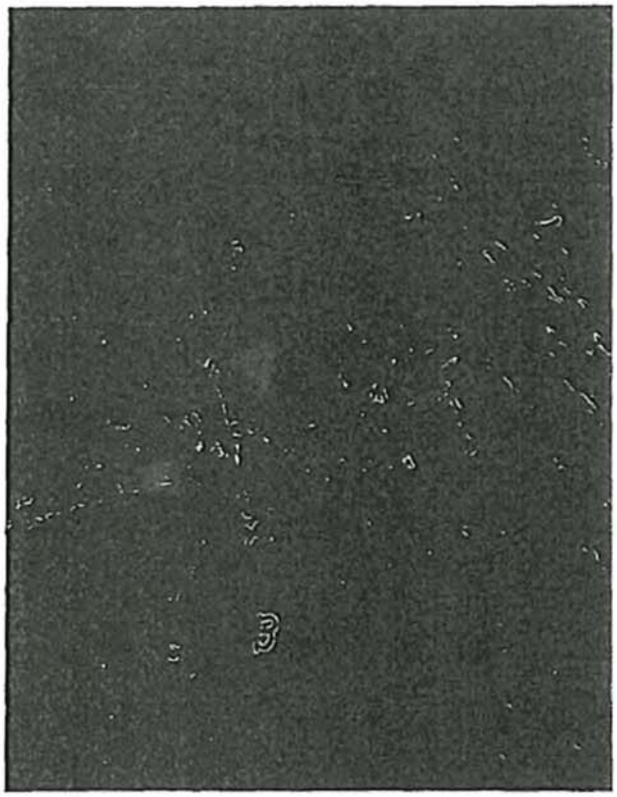
In thin section the majority of the rock was composed of a fine-grained foliated material believed to be primarily talc with intermixtures of chlorite. Some platy talc was noted that occurred as elongated particles subparallel to the foliation of the fine-grained talc and chlorite. Carbonate in this slide was relatively minor, occurring primarily as large, isolated grains. Many embayments of the fine-grained, talcose, foliated material into the carbonate particles were noted. Chlorite also occurred as isolated thin seams and appeared, optically, to be concentrated at the contacts of the fine-grained talcose material and the carbonate particles. To confirm this point, an electron microprobe traverse was made across an embayment of the fine-grained talcose material into a carbonate particle (Photomicrograph 5). The line X-X' on the photomicrograph is the approximate line of traverse. Figure 1 shows the results of the line scans for the elements Mg, Al, and Si. As can be noted the scan for Mg shows a slight drop in intensity across the talcose seam area indicating a slightly lesser amount of Mg in the talcose seam than in the carbonate particles. The scan for Si

Exhibit 2 - continued

shows a drastic increase across the talcose seam and the scan for Al shows increases at the boundaries of the fine-grained talcose seam and the carbonate particles. In essence the above indicates:

1. The carbonate particle is magnesite - $MgCO_3$.
2. The bulk of the talc seam contains primarily Mg and Si indicating talc - $Mg_3(OH)_2(Si_2O_5)_2$.
3. The contact areas between the fine-grained talcose embayment and the carbonate particle contain Mg, Al, and Si indicating a chlorite type - $Mg[4.9\text{-}5.3]\ Al(Si_{2.3-3.2}Al_{0.8-1.7})O_{10}(OH)_8$.

This rock may be classified as a talc-chlorite augen schist. The concentration of chlorite at the talc-carbonate contact indicates some degree of retrogressive metamorphism.



Photomicrograph No. 5. Specimen 6H-167 showing a fine grained talc-chlorite embayment in a carbonate particle.

(A) Fine grained talc-chlorite intermixture.
(B) Magnesite, $MgCo_3$, particle.
(C) Chlorite seam.
(D) X-X' approximate electron microprobe traverse shown in Figure 1.

Scale 0.1 mm

Crossed polarizers

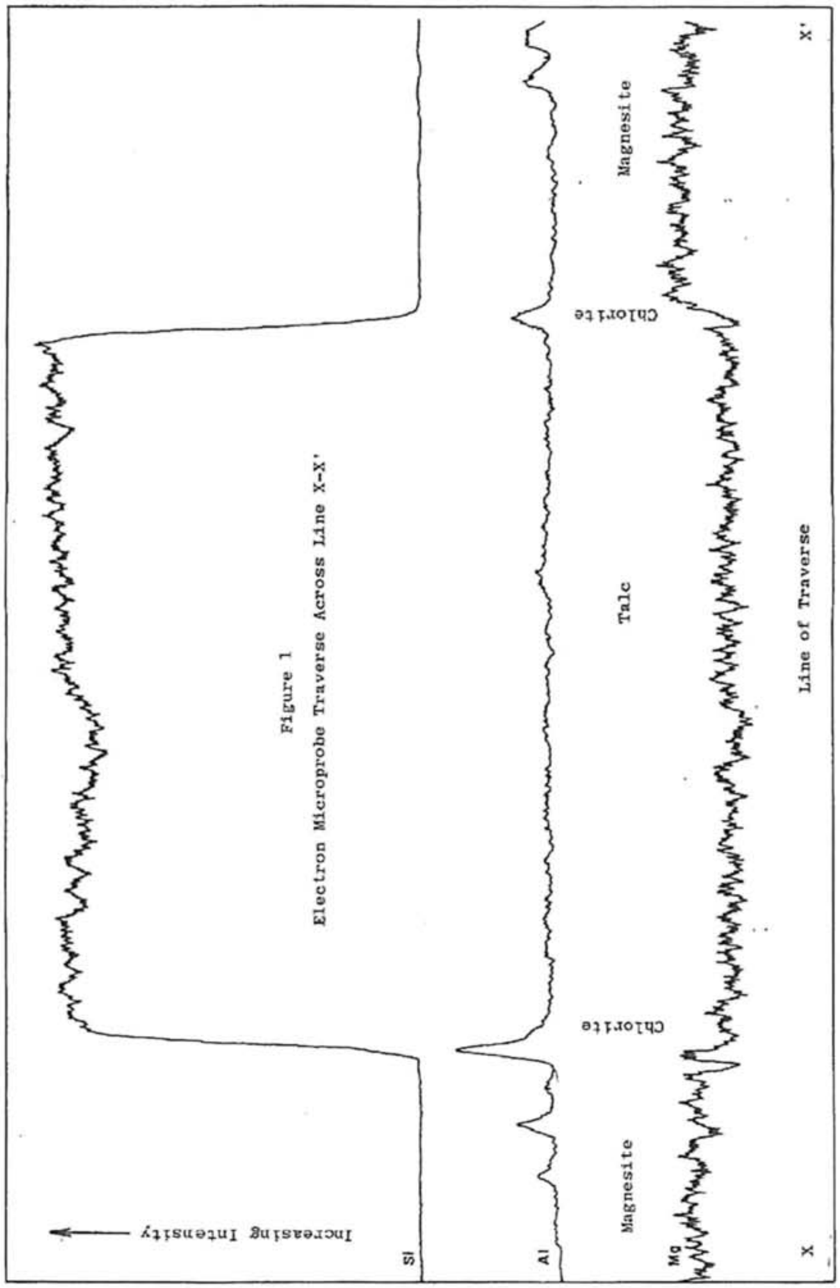


Figure 1

Electron Microprobe Traverse Across Line X-X'

Exhibit 2 - continued

Specimen 6H-169:

In hand specimen this is a medium dark gray foliated rock containing numerous yellowish gray carbonate eyes. These eyes range in size from 1.0 mm to about 2.0 cm. Dark grayish black thin schistose seams occur as curved mineral trains around the carbonate eyes.

In thin section the specimen consisted of major carbonate and moderate talc and chlorite. About one-half of the carbonate occurred as large grains that were partially or wholly shattered along crystalline boundaries. The other half occurred as granulated areas, some subparalleling the foliation of the host rock. The host rock was a fine-grained foliated mixture of talc and chlorite with some recognizable thin chlorite seams. Some platy-talc grains were noted that were elongated and tended to follow the schistosity of the fine-grained talc and chlorite mixture. This rock may be classified as a schistose augen marble.

Exhibit 2 - continued

Specimen 6H-176:

In hand specimen this is an olive gray rock containing some carbonate eyes ranging in size from 1.0 mm to 7.0 mm. The specimen contains some indistinct grayish black seams. The foliation is not as pronounced as in previous samples.

In thin section most of the specimen consists of platy-talc grains intergrown with about equal amounts of fine-grained talc and chlorite (Photomicrograph 6). A finer-grained talc and chlorite is somewhat foliated and a few isolated elongated platy-talc grains paralleling the foliation were noted. The larger platy-talc grains, as shown in Photomicrograph 6, invariably have many fibrous-talc, and possibly tremolite-actinolite inclusions. The carbonate occurred as isolated grains, some of which showed embayments of the finer-grained talc and chlorite. Some distinct, thin, chlorite seams were noted occurring as curved mineral trains throughout the specimen. This rock may be classified as a talc-chlorite schist.

Photomicrograph No. 6. Specimen 6H-176 showing associations of platy talc grains with fibrous inclusions (A), finer grained intermixtures of talc and chlorite (B) and a carbonate particle (C).

Scale

0.1 mm

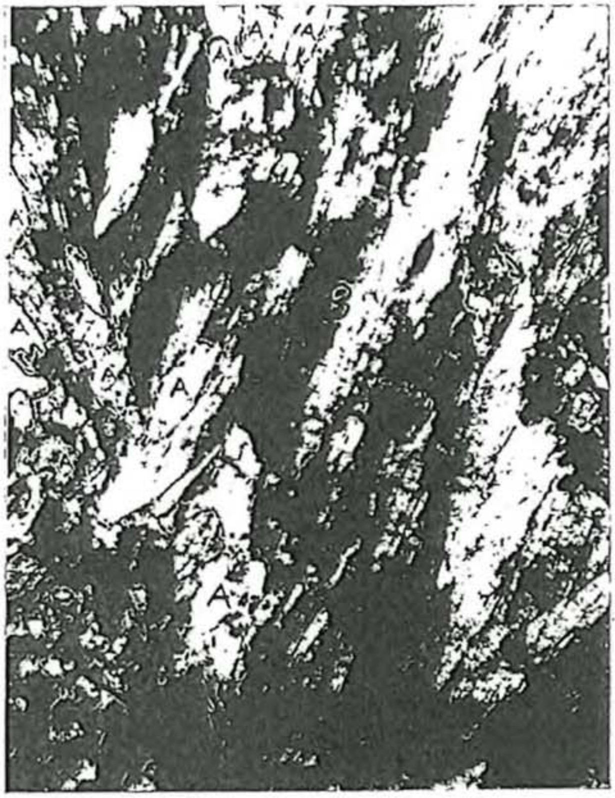
Crossed polarizers

Exhibit 2 - continued

Specimen 34H-507C:

In hand specimen this is a grayish black very-fine-grained rock showing a very-finely-divided foliation. Some very thin bluish white intermittent seams were noted that parallel the foliation.

In thin section the specimen consisted almost wholly of foliated chlorite particles. Intermixed with this foliated chlorite was a minor amount of platy talc that tended to sub-parallel the foliated texture (Photomicrograph 7). No carbonate particles were observed. A trace amount of small lath-like biotite particles was noted intermixed with the chlorite. This rock may be classified as a chlorite schist.



Photomicrograph No. 7. Specimen 34H-507C showing platy talc grains (A) in a foliated chlorite matrix (B).

Scale

0.1 mm

Crossed polarizers

Exhibit 2 - continued

Specimen 34H-518:

In hand specimen this is a foliated rock containing carbonate augen ranging in size from 2.0 mm to 1.5 cm. Grayish olive and light bluish gray seams ranging from 0.1 mm to 5.0 mm wide occur as curved mineral trains around the carbonate eyes.

In thin section the specimen consists of fine-grained, foliated-talc and/or chlorite areas and other distinct thin foliated seams that appear to be primarily chloritic. A moderate amount of carbonate, occurring mostly as relatively fine-grained aggregates, tends to be lineated and subparallels the foliated rock texture. Very little embayment of the fine-grained talc and chlorite into the carbonate was noted. This rock may be classified as an augen marble schist.

Exhibit 2 - continued

Specimen 35H-153:

In hand specimen this is an extremely fine-grained, grayish-black aphanitic rock. In reflected light some very tiny white crystals were noted.

In thin section the rock consisted of highly strained, subparallel feldspar laths set in an extremely fine-grained and highly-weathered groundmass (Photomicrograph 8). High magnification examination of this groundmass suggested it to be composed of a felty mat of extremely fine-grained feldspar laths possibly intermixed with quartz, clay, and a glassy phase. Some eroded talc or chlorite plates were noted as inclusions in the rock. These plates, in places, yielded undulatory extinction and possessed fibrous talc and/or tremolite-actinolite inclusions. Due to the high degree of straining and weathering no definite rock classification could be made, but, the rock has indications of being a highly altered basalt.

Photomicrograph No. 8. Specimen 35H-153 showing strained feldspar laths set in a highly weathered fine grained opaque groundmass. The outlined area is a platy talc or chlorite grain.

Scale

0.1 mm

Crossed polarizers

Exhibit 2 - continued

Specimen 35H-164:

In hand specimen this is a rock showing a contact zone between an aphanitic grayish black rock similar to 35H-153 and a schistose grayish black rock. No distortion of the lamellae are apparent at the contact. There appears to be an altered zone in the aphanitic grayish black rock along the contact. This zone is in the form of a slightly lighter colored band about 4.0 mm wide.

In thin section the schistose rock appears similar to 2H-301 (Photomicrograph 1) except the biotite laths are not as well defined. The schistose rock consists mainly of lineated biotite laths intermixed with granulated quartz and lesser amount of feldspar. Some degree of straining was noted in almost all crystals. The dense aphanitic contact rock is very similar to the weathered basalt noted in 35H-153. Most of the contact zone is sharp but in a few places frayed ends of the biotite were noted extending into the basalt. In one area a xenolith of schist was noted in the basalt (Photomicrograph 9). A definite flow-structure lineation of feldspar laths around the xenolith is apparent, indicating the basalt was intruded into the schist. A higher concentration of fine-grained, opaque, weathered material was noted in the basalt in the vicinity of the contact. Some irregular chlorite blebs were also noted in the schist. These factors may indicate some degree of hydrothermal alteration.

Exhibit 2 - continued

This rock may be classified as a contact between a basalt and a quartz-biotite schist.

Photomicrograph No. 9. Specimen 35H-164 showing the contact between the quartz biotite schist (A) and the basalt (B). (X) is a xenolith of the quartz biotite schist in the basalt.

Scale

0.1 mm

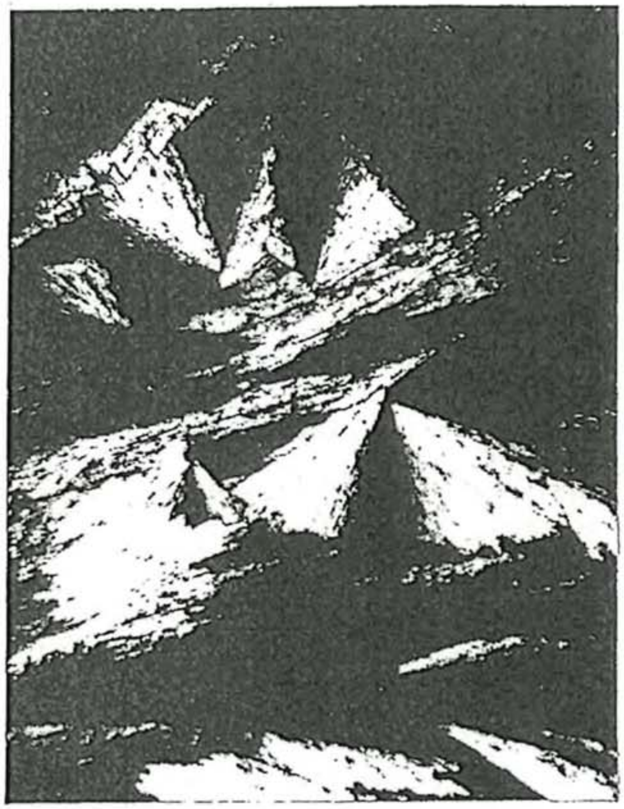
Crossed polarizers

Exhibit 2 - continued

Specimen 35H-223A:

In hand specimen this is a grayish black rock possessing finely defined schistosity. There is a large quartz particle in the rock about 1.5 cm in diameter. Also in the rock is a milky white band about 0.5 mm wide directly underlain by a black, dense, fine-grained zone about 0.5 mm wide. Some very thin stringers of a bronze colored metallic were visible throughout the rock. These metallic stringers were parallel to the foliation in all cases.

In thin section the bulk of the rock consists of sub-parallel laths of chlorite and lesser amounts of biotite that are intermixed with areas of granulated quartz and lesser amounts of feldspar. There are some relatively large biotite grains that are not oriented with the foliated texture. The black, dense, aphanitic zone noted in the hand specimen is tremolite-actinolite (Photomicrograph 10). The milky white zone directly overlying the tremolite-actinolite zone is a granulated mixture of quartz and strained feldspar. The large particle noted was quartz. The thin metallic seams noted in the hand specimen were opaque and could not be positively identified in thin section. This rock may be classified as a chlorite schist with inclusions of tremolite-actinolite, quartz and granulated mixtures of quartz and feldspar.



Photomicrograph No. 10. Specimen 35H-223A showing radiating tremolite-actinolite crystals.

Scale

0.1 mm

Crossed polarizers

Exhibit 2 - continued

Specimen 35H-223B:

In hand specimen this is a grayish black, fine-grained rock exhibiting very finely defined schistosity. A few very thin metallic seams are present that parallel the schistosity. A few subspherical, light brownish gray phenocrysts were noted. These may be altered garnets. A thin dark seam about 0.2 mm wide was noted transversing the rock. A slightly lighter colored zone about 5.0 mm wide was noted on either side of this seam. This zone contains many indistinctly defined weathered garnets.

In thin section the majority of this rock consisted of schistose biotite and chlorite laths intermixed with granulated quartz and lesser amounts of feldspar. Some larger blocky biotite grains were noted that did not follow the foliation of the rock (Photomicrograph 11). The dark seam noted in the hand specimen was a ribbon-like, first-order-grey seam exhibiting wavy extinction. It could not be definitely ascertained whether this seam was talc or highly strained quartz. The lighter colored 5.0 mm zones on either side of this seam consisted primarily of granulated quartz grains with a much lesser amount of biotite than is present in the host rock. Many euhedral to subhedral isotropic particles, presumably garnets, are concentrated in these zones. These garnets are speckled throughout with a dark opaque, very fine-grained material. In some garnets this

Exhibit 2 - continued

concentration is quite heavy. In general, less of this fine-grained opaque material was noted in these garnets than in the garnets in specimen 2H-301. This rock may be classified as a garnetiferous biotite-chlorite-quartz schist.

Photomicrograph No. 11. Specimen 35H-223B showing oriented lath like biotite (A) and oriented irregular lath like chlorite particles (B) set in a fine grained quartz matrix (lighter areas). large blocky crystals cutting schistocity are biotite.

Scale

0.1 mm

Uncrossed polarizers

Exhibit 2 - continued

Specimen 35H-223C:

In hand specimen this is a grayish black, fine-grained rock exhibiting a finely-defined schistose texture. There are some very thin, lighter colored seams throughout the rock that parallel the schistose structure.

In thin section the overall appearance of this rock was similar to 35H-223B. There were some seams showing more chlorite and biotite than in 35H-223B. In this rock there are some seams that are composed mostly of granulated quartz with very little chlorite. These are probably the thin, lighter-colored seams noted in the hand specimen. The bulk of the rock may be classified as a chlorite-biotite-quartz schist. In certain restricted areas it could be classified as a biotite-chlorite-quartz gneiss.

Exhibit 2 - continued

Specimen 35H-398:

In hand specimen this is a dark, greenish-gray fine-grained rock exhibiting a definite schistose structure. There are several variable-sized grayish black seams in the rock that parallel the schistose structure. A few carbonate eyes were noted that ranged from 0.5 to 3.0 mm.

In thin section the rock consists primarily of very fine-grained foliated-talc and chlorite particles. A few isolated, elongated platy-talc grains were noted that were subparallel to the schistosity of the rock. Chlorite was also noted concentrated in seams and as curved mineral trains around the carbonate augen in the rock. These chlorite seams generally paralleled the host rock schistosity. The overall texture of the rock is similar to specimen 6H-150 (Photomicrograph 4), but had only a minor amount of isolated carbonate particles. This rock may be classified as a talc-chlorite schist.

Exhibit 2 - continued

Specimen 35H-400:

In hand specimen this is a fine-grained, dense, grayish-black rock exhibiting a very-finely-defined schistose structure. A minor amount of small, elongated inclusions were noted that did not parallel the schistosity of the host rock.

In thin section the rock consists of a felty, sublineated mass of primarily chlorite crystals with lesser amounts of felty sublineated talc. There are some relatively large lath-like inclusions of fine-grained talc and/or chlorite (Photomicrograph 12). These laths do not parallel the lineation of the host rock. This rock may be classified as a chlorite schist.

Photomicrograph No. 12. Specimen 35H-400 showing a large inclusion composed of fine grained talc and/or chlorite cutting foliation of host rock.

Scale 0.1 mm

Crossed polarizers

Exhibit 2 - continued

Specimen 36H-437:

In hand specimen this is predominantly a dark greenish gray rock exhibiting some degree of curved mineral training of dark greenish gray, dark gray and greenish gray schistose seams around some large, rather indistinct, very-light-gray carbonate eyes ranging from 1.0 mm to 1.0 cm. A rather large, very-light-gray zone cuts the rock. This zone may be composed of granular carbonate particles.

In thin section a major amount of the slide was composed of an intermixture of fine-grained schistose talc and chlorite. A minor amount of elongated platy-talc grains were noted intermixed with the fine-grained schistose talc and chlorite. They tend to parallel the foliation. A moderate to major amount of carbonate was noted. The carbonate occurred as large particles and as finer-grained eyes that tend to folow the lineation of the host rock. Some thin chlorite seams were noted throughout the slide that paralleled the lineation of the host rock and occurred as curved minerals trains around the carbonate particles. This rock may be classified as an augen marble schist.

Exhibit 2 - continued

Specimen 36H-438:

In hand specimen this is a dark gray to dark greenish gray foliated rock containing some very large carbonate grains. These carbonate grains range in size from fine, granulated material concentrated in a seam about 8.0 mm wide to individual phenocrysts 2.5 to 3.0 cm in diameter. Some curved mineral training of the schistose phase around the carbonate grains was noted.

In thin section this slide is very similar to 36H-437. There was more foliated platy talc and more carbonate noted. This rock may be classified as a schistose augen marble.

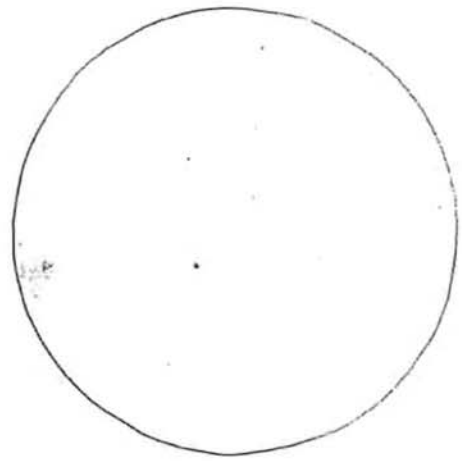
Exhibit 2 - continued

Specimen 37H-367:

In hand specimen this is a dark greenish gray foliated rock containing a large percent of large, yellowish gray carbonate particles with relatively indistinct boundaries. Some of these particles range up to 2.0 cm in diameter.

In thin section, the rock consisted primarily of variable sized carbonate particles. A little platy talc was noted intermixed with some of the granulated carbonate zones (Photomicrograph 13A). Felty, subfoliated areas composed of fine-grained talc and/or chlorite were noted that tended to occur as curved mineral trains around the carbonate areas. Photomicrograph 13B shows an interference figure of the platy talc grain shown in Photomicrograph 13A. Talc is characterized by a 2V approaching 2°. The interference figure shows the biaxial figure of its maximum separation indicating a very low 2V. This rock may be classified as a schistose marble.

13 A



13 B

Photomicrograph No. 13A. Specimen 37H-367 showing a platy talc grain (outlined) set in a matrix of variable sized carbonate grains.

Scale

0.1 mm

Crossed polarizers

Photomicrograph No. 13B. Biaxial interference figure of platy talc grain shown in Photomicrograph 13A.

Exhibit 2 - continued

Specimen 37H-388:

In hand specimen this is a foliated rock exhibiting curved mineral trains of grayish black seams and zones of schistose material around medium gray "eyes" and linear stringers of material that may be talcose.

In thin section the rock consisted mostly of a felty mass of fine-grained foliated talc and/or chlorite grains. The chlorite content appeared to be heavier in some areas and zones of the slide. A moderate to minor amount of carbonate was noted in the slide. Most carbonate occurred as granular masses that tended to subparallel the lineation of the rock. No recognizable, wholly-chlorite seams were noted in the slide. This rock may be classified as a talc-chlorite augen schist.

Exhibit 2 - continued

Specimen 37H-400:

In hand specimen the rock appears to be predominantly a medium gray, foliated rock with stringers of greenish gray material and some indistinct, light greenish gray, possibly talcose, blebs ranging up to 1.0 cm. Curved mineral training of the darker, schistose, seams around the lighter colored blebs is evident.

In thin section this rock appears very similar to 37H-367. As in 37H-367 some lineated platy talc was noted that paralleled the lineation of the rock. There are some relatively large, dark opaque areas disseminated throughout the slide. This rock may be classified as a talc-chlorite augen schist.

Exhibit 2 - continued

Specimen 37H-440:

In hand specimen this is predominantly a dark greenish black, foliated rock with some rather large, lighter colored, greenish gray seams up to 1.0 cm wide. These seams appear to be predominantly carbonate.

In thin section the rock consists mostly of fine-grained foliated talc and/or chlorite particles with a fairly large percentage of intermixed, lineated platy-talc particles. These platy-talc grains tend to parallel the schistosity of the host rock. A moderate to minor amount of carbonate was noted. The carbonate occurred both as large particles showing much embayment of the fine-grained host rock and as finer-grained granulated eyes subparallel to the schistosity of the host rock. This rock may be classified as a marble schist showing a minor degree of augen structure.

Exhibit 2 - continued

Specimen 37H-450:

In hand specimen this is a foliated, predominantly greenish black rock that exhibits curved mineral training of grayish black seams around greenish gray eyes ranging from 1.0 mm to 9.0 mm.

In thin section the rock consists primarily of fine-grained talc and/or chlorite particles that exhibit a foliated texture. There are some linear platy-talc grains intermixed with, and following the foliated nature of the fine-grained host rock. Some seams of predominantly talc and some seams of predominantly chlorite were noted. A moderate amount of carbonate occurred as variable-sized eyes scattered throughout the slide. Curved mineral training of the host rock around these particles is evident. Many of the carbonate particles are fractured and eroded and many show embayments of the fine-grained talc and/or chlorite. Some platy-talc grains were noted as inclusions in the carbonate particles. The greenish-gray eyes noted in hand specimen must be the carbonate particles noted in this section. The greenish color may be due to some degree of serpentinization of the rock. This rock may be classified as an augen marble schist or, if truly serpentinized, as a verde antique.

Exhibit 2 - continued

Specimen 37H-451:

In hand specimen this rock had a very similar appearance to 37H-450.

In thin section the rock had the same general appearance as 37H-450. There was one seam noted in the rock that was filled with a ribbon-like mass of platy talc. On either side of this platy-talc seam the schistose groundmass was much denser than in the rest of the host rock (Photomicrograph 14). It could not be ascertained optically whether this zone was higher in talc or chlorite than the surrounding host rock. This rock may be classified as an augen marble schist or, if truly serpentinized, possibly a verde antique.

Photomicrograph No. 14. Specimen 37H-451 showing ribbon-like platy talc seam (A) surrounded by dense zones of fine grained schistose talc and/or chlorite (B).

Scale
0.1 mm

Crossed polarizers

Exhibit 2 - continued

Specimen 37H-452:

In hand specimen this is predominantly a greenish black schistose rock in which there is some degree of curved mineral training around some greenish gray carbonate eyes ranging in size from 2.0 mm to 1.0 cm. Some thin grayish black seams are present that parallel the foliation and tend to be concentrated at the contacts between the phenocrysts and the host rock.

In thin section the host rock consists of fine-grained foliated talc and/or chlorite particles. Curved mineral training around larger carbonate particles is evident. A few elongated platy-talc laths were noted that parallel the foliation of the finer particles. The carbonate occurred as a moderate to minor amount of variable-sized particles. Most larger grains showed much embayment of the finer-grained host rock. Some granulated carbonate eyes were noted that tended to subparallel the lineation of the host rock. Some thin chlorite seams were present. These seams tended to be concentrated at the contacts of the carbonate particles and the host rock. This rock may be classified as an augen marble schist.

Exhibit 2 - continued

Specimen 37H-453:

In hand specimen this is predominantly a grayish black rock in which schistosity is finely defined. There are several variable sized seams of light bluish gray material in the rock that tend to parallel the schistosity. These seams range from 0.1 mm to 6.0 mm in width.

The thin section of this rock was too thin and much plucking out of grains was noted. What was left consisted of variable-sized carbonate particles intermixed with fine-grained lineated talc and/or chlorite particles. This rock, based upon the above data, may be classified as a verde antique.

Exhibit 2 - continued

Specimen 37H-481:

In hand specimen this is a dark grey to greenish black rock exhibiting a finely defined schistose structure. There are some indistinct light greenish gray seams in the rock ranging up to 8.0 mm wide. Some indistinct, light greenish gray carbonate particles are scattered throughout the rock. These carbonate particles range in size from 1.0 mm to 3.0 mm.

In thin section the rock consists of a felty, subfoliated mass of fine grains that appear to be mainly chlorite. Some zones that appear richer in talc were noted. Some elongate platy-talc grains were noted that generally followed the foliation of the rock. A minor amount of carbonate was noted both as isolated crystals and as granulated seams subparallel to the foliation of the host rock. Very few instances were noted in which the groundmass tended to actually "mineral train" around the carbonate particles. A minor amount of dark opaques were noted as interstitial fillings and as isolated grains. This rock may be classified as a chlorite schist.

Exhibit 2 - continued

Specimen 37H-485:

In hand specimen this is a predominantly grayish black to greenish black rock exhibiting a finely defined schistose structure. Numerous light greenish gray phenocrysts, ranging from 1.0 to 2.0 mm are noted dispersed throughout the rock.

In thin section the rock had the same general appearance as 37H-481 only showing a larger number of carbonate eyes. Curved mineral training of the fine-grained host rock around these eyes was not well defined. This rock may be classified as a chloritic marble schist.

Exhibit 2 - continued

Specimen 37H-485:

In hand specimen this is a predominantly grayish black to greenish black rock exhibiting a finely defined schistose structure. Numerous light greenish gray phenocrysts, ranging from 1.0 to 2.0 mm are noted dispersed throughout the rock.

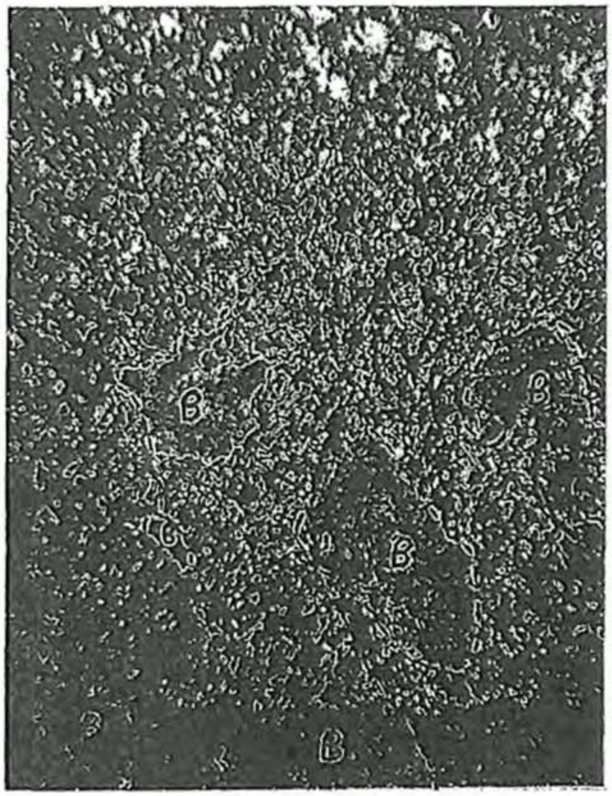
In thin section the rock had the same general appearance as 37H-481 only showing a larger number of carbonate eyes. Curved mineral training of the fine-grained host rock around these eyes was not well defined. This rock may be classified as a chloritic marble schist.

Exhibit 2 - continued

Specimen 37H-487:

In thin section this rock has the same general appearance as 37H-485. One distinct light greenish gray seam 3.0 to 8.0 mm wide is present that appears to be perpendicular to the finely defined schistose texture of the rock.

In thin section the rock consists of a felty, subfoliated matrix of fine-grained talc and/or chlorite particles. Included in this felty groundmass are irregular inclusions composed of fine-grained talc and/or chlorite and a moderate amount of carbonate particles (Photomicrograph 15). A very minor degree of curved mineral training of the fine-grained host rock around the carbonate particles and the fine-grained talc and/or chlorite inclusions was noted. This rock may be classified as a chloritic talc marble schist cut by a vein which is predominantly talcose.



Photomicrograph No. 15. Specimen 37H-487 showing irregularly shaped particles composed of fine grained talc and/or chlorite (B) set in the felty, sub-foliated host rock matrix (A).

Scale 0.1 mm

Crossed polarizers

Exhibit 2 - continued

Specimen 37H-490:

In hand specimen this rock is very similar to 37H-485 except it contains many more carbonate particles. One light greenish gray seam about 3.0 mm wide cuts the rock parallel to the finely defined schistose texture.

In thin section this rock is very similar to 37H-487. There are a few more inclusions composed of fine-grained talc and/or chlorite and a few more carbonate particles. The 3.0 mm light greenish gray seam noted in the hand specimen analysis consists of an intermixture of fine-grained talc and chlorite (talc probably predominates) in a schistose texture. This rock may be classified as a chlorite-talc marble schist cut by a vein that is predominantly talcose.

Exhibit 2 - continued

Specimen 37H-491:

In hand specimen one-half of this rock is a dense grayish black rock containing some light greenish gray phenocrysts about 1.0 mm to 3.0 mm in diameter. Some thin light greenish gray seams that give the rock an augen type appearance were noted. The other half of the rock consists of irregular large blebs of light greenish gray carbonate shot through with thin, dark grayish black seams. These darker seams in the lighter portion of the rock are randomly oriented.

In thin section the darker portion of the rock appears very similar to 37H-490 but curved mineral training is much better defined. The lighter area consists of variable-sized carbonate particles. In this carbonate area, fine-grained gnarled seams of what appear to be predominantly chlorite with some talc occur between the carbonate grains. Gnarled and twisted seams of chlorite occur at the contact between the carbonate and the darker foliated rock. This rock may be classified as a contact zone between a chloritic marble schist and a chloritic schistose marble.

Exhibit 2 - continued

Specimen 37H-504:

In hand specimen this is a grayish black foliated rock that has a greenish gray inclusion about 8.0 mm wide and a light greenish gray carbonate eye about 1.0 cm wide. Some smaller greenish gray particles are scattered throughout the slide. There are some concentrations of thin darker seams along the carbonate contacts.

The thin section of this specimen was unusable for identification. However, based upon the hand specimen analysis, this rock may be classified as a chloritic marble schist.

Exhibit 2 - continued

Specimen 37H-512:

In thin section this is a foliated rock containing numerous irregular carbonate eyes that range in size from 1.0 mm to 1.0 cm. These carbonate eyes are surrounded by grayish black and greenish black curved mineral trains that give the rock an augen type of appearance.

In thin section the rock consists of granulated carbonate particles shot through and surrounded by fine-grained, foliated chlorite and/or talc. The fine-grained material is in curved mineral trains around the carbonate particles. Some elongated platy-talc grains were noted in the fine-grained portion of the rock in which they parallel the foliation. This rock may be classified as a schistose marble.

Exhibit 2 - continued

Specimen 38H-404:

In hand specimen this is an aphanitic, medium greenish gray, dense rock in which foliation could not be defined.

In thin section this rock has a similar appearance to the weathered basalt described in 35H-153. There was a lesser amount of dark opaque fine-grained material making the felty groundmass of tiny feldspar laths more obvious.

This rock may be classified as a basalt.

Exhibit 2 - continued

Specimen 39H-458:

In hand specimen this is predominantly grayish black foliated rock. There are a few very thin lighter colored seams in the rock that occur parallel to the foliation.

In thin section the majority of the rock consists of a fine-grained foliated matrix of chlorite and/or talc. There are some stringers and lineated blebs of platy talc dispersed throughout the slide. A few thin, definitely chloritic seams were noted. A minor amount of carbonate was noted as isolated crystals containing inclusions of platy talc and fine-grained talc and/or chlorite. This rock may be classified as a chlorite-talc schist.

Exhibit 2 - continued

Specimen 39H-532:

In hand specimen this rock contains greenish gray carbonate eyes surrounded by curved mineral trains of a grayish black foliated material.

In thin section this rock had the same general host rock appearance as 39H-458 but contained more curved mineral training around carbonate particles, lesser platy talc and more carbonate eyes. This rock may be classified as a chlorite-talc augen marble schist.

Exhibit 2 - continued

Specimen 39H-534:

In hand specimen this rock is similar to 39H-532 except it contains more and larger eyes and stringers of greenish gray carbonate and lesser amounts of curved mineral trained grayish black schistose material.

In thin section this rock appears similar to 39H-532 but contains more carbonate and lesser areas of foliated fine-grained chlorite and/or talc. The carbonate ranges from extremely large grains showing embayment of the fine-grained chlorite and/or talc to granulated seams and eyes that parallel the foliation of the rock. This rock may be classified as a schistose augen marble.

Exhibit 2 - continued

Specimen 39H-544:

In hand specimen this rock contains a large percentage of greenish gray carbonate blebs and eyes ranging from 1.0 cm to over 2.5 cm set in a minor amount of finely defined, schistose, grayish black material.

In thin section this rock is very similar to 39H-534 except there is much more carbonate material and much less fine-grained, foliated, chlorite and/or talc. This rock may be classified as a schistose augen marble.